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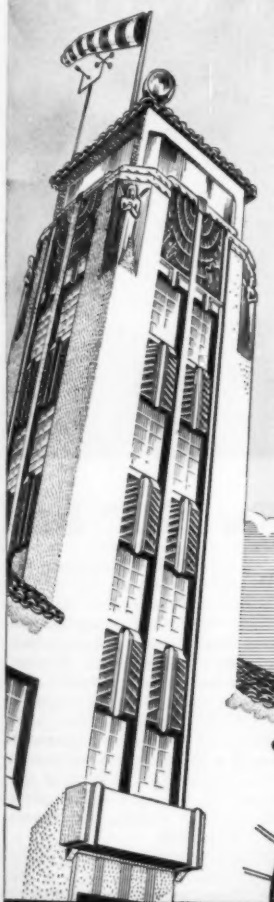

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12th YEAR OF PUBLICATION

VOL. XXIII *No. 2*

Edited by Charles Hampson Grant

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Published Monthly by JAY PUBLISHING CORP., Mount Morris, Illinois
Editorial and General Offices, 551 Fifth Avenue, New York City.
George C. Johnson, President Jay P. Cleveland, Advertising Manager
551 Fifth Avenue, New York, N.Y.
Entered as second-class matter Dec. 6, 1934, at the post office at Mount Morris, Ill., under the act of March 3, 1879. Additional entry at New York, N. Y.
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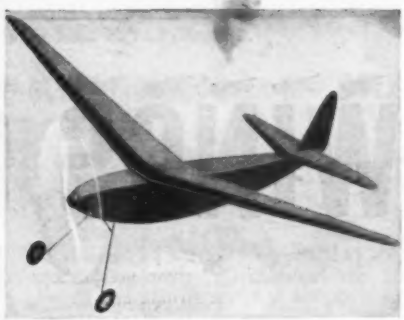

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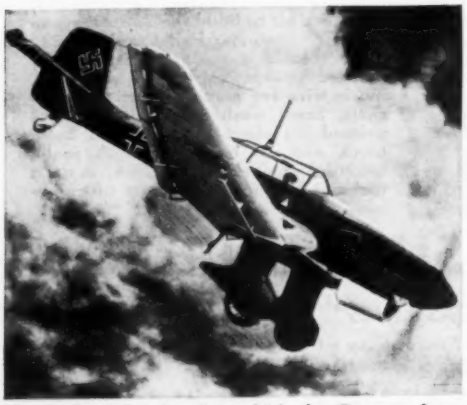
A French Leo 45 bombardment plane with new low-drag engine cowls around two 1120 hp. motors

WINGS OF DEMOCRACY

WITH the threat of the publicized total air war materializing, great preparations are going on in Great Britain and French Colonies to build up air strength. New air bases are being built, others enlarged or improved and the storage of supplies and munitions being attended to. Hundreds of fighting planes are leaving the great factories and the home skies are dotted with the fledgling wings of young men being trained in the art of winged death. Mars is again calling youth and it is coming from the far corners of the Empire: Australia, Canada, South Africa, heeding the call of King and Country. In French colonies, too, the struggle is going on..



The Junkers dive bomber which the Germans have been using against the Allies with deadly effect.

The war is felt even here in America with our huge factories working overtime to fill the large orders for even more fighters and bombers. The air service of the British is in sharp contrast with that of their enemy. Because of the shortage of raw materials, the Reich was forced to standardize and simplify to a few models, and in review we see that England has six more types of fighters in service and possesses twice as many bomber types. These figures do not include aircraft in process of delivery from the United States which brings the total to fourteen!

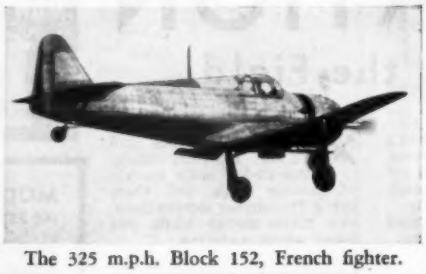
That Allied planes are serviceable was aptly shown in their ability to withstand the rigors of constant out-of-door conditions, including heavy snows, rain and freezing temperatures and still continue to carry out their missions. Extensive use of both the netted and painted varieties of camouflage and open air hangers typified by many squadrons exploitation of the neighboring trees.

Tents suffice for barracks while more substantial quarters are hastily erected.

Living up to all expectations the heavily armed British "Hurricane" and "Spitfire" interceptors, mounting eight Browning rifle-calibre guns have proven more than a match for Germany's Heinkel and Dornier bombers. The "Spitfires" which is of all-metal construction holds a measure of superiority over the "Hurricane," with improved handling characteristics and lower landing speed.

On the Western Front the American Curtiss P-36 proved the best all around fighter in action. With six guns it combines rugged strength with speed and maneuverability that made it a favorite among French units. No small addition to these will be the several thousand fighters in process of delivery from America. A large portion of these are cannon-equipped 400 m.p.h. plus fighters like the

A flight of Bristol Blenheim bombers.



The 325 m.p.h. Block 152, French fighter.

The 3800 hp. Potez 141 reconnaissance patrol boat which the French are using extensively in patrolling their coasts

The 8 gun British Boulton Paul "Defiant" that has proved the equal of any German plane. Note power-driven turret. (B.C.P.)

A Nieuport C.A.O. 200, 340 m.p.h. fighter

The famous Morane fighter used with the Curtiss 75. (B.C.P.)

Glimpses of Aerial Fighters and Their Equipment That the British Are Flying to Stem the Surge of German and Italian Air Power

By ALICE MOLBECK and E. J. BULBAN

Lockheed P-38, Bell P-39, Curtiss P-40 and Grumman "Skyrocket" together with the eight-gunned Brewster F2A. England expects the debut of some newer and deadlier German types for which they have not had the time to design a counter threat, which has necessitated the purchase of this equipment. At any rate the reputation of U.S. fighters makes them an anxiously awaited supplement.

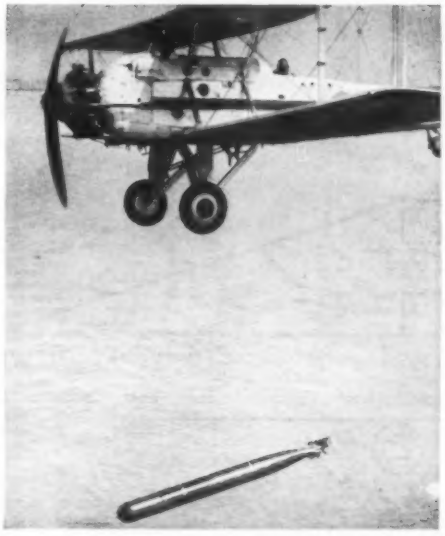
Among the ships in production since the outbreak of war is the British Boulton Paul "Defiant," a two place low-wing monoplane mounting four wing guns and equipped with a four gun power-driven turret behind the pilot. Powered with a Rolls Royce "Merlin" of 1,150 hp., it does over 310 m.p.h. This, together with the Hawker "Hotspur" of similar design, falls in the bomber-escort class.

A French counterpart of the "Hurricane" was the Morane 406, powered by a 850 hp. Hispano Suiza 12 Y. 31 engine and has a top speed of 325 m.p.h. The wings are of all-metal stressed skin construction; the fuselage being built of steel tubing covered with fabric except for metal plates around the engine. Armament consists of a cannon firing through the hollow propeller hub and two machine guns in the wings.

The Bloch 152, bearing a resemblance to the Curtiss P-36, is an all-metal stressed skin covered monoplane with a P&W "Twin Wasp" of 850 hp., also does 325 and mounts two cannon in the wings and two synchronized machine guns. There are also a large number of the Dutch Koolhoven F.K. 58 metal and wood fighters in service with the Hispano Suiza 14 AA engine of 1,080 hp. With wooden wings, plywood covered and a steel tube fabric-covered fuselage, the top speed is of 310 m.p.h. A very large cowl and elaborate landing gear are its outstanding features. Noticeable is that all three of these French fighters have strut braced tails.

Apart from these tried and true types there are several modified machines which are being tested as long distance fighters, notably the Brtistol "Blenheim" IV and Potez

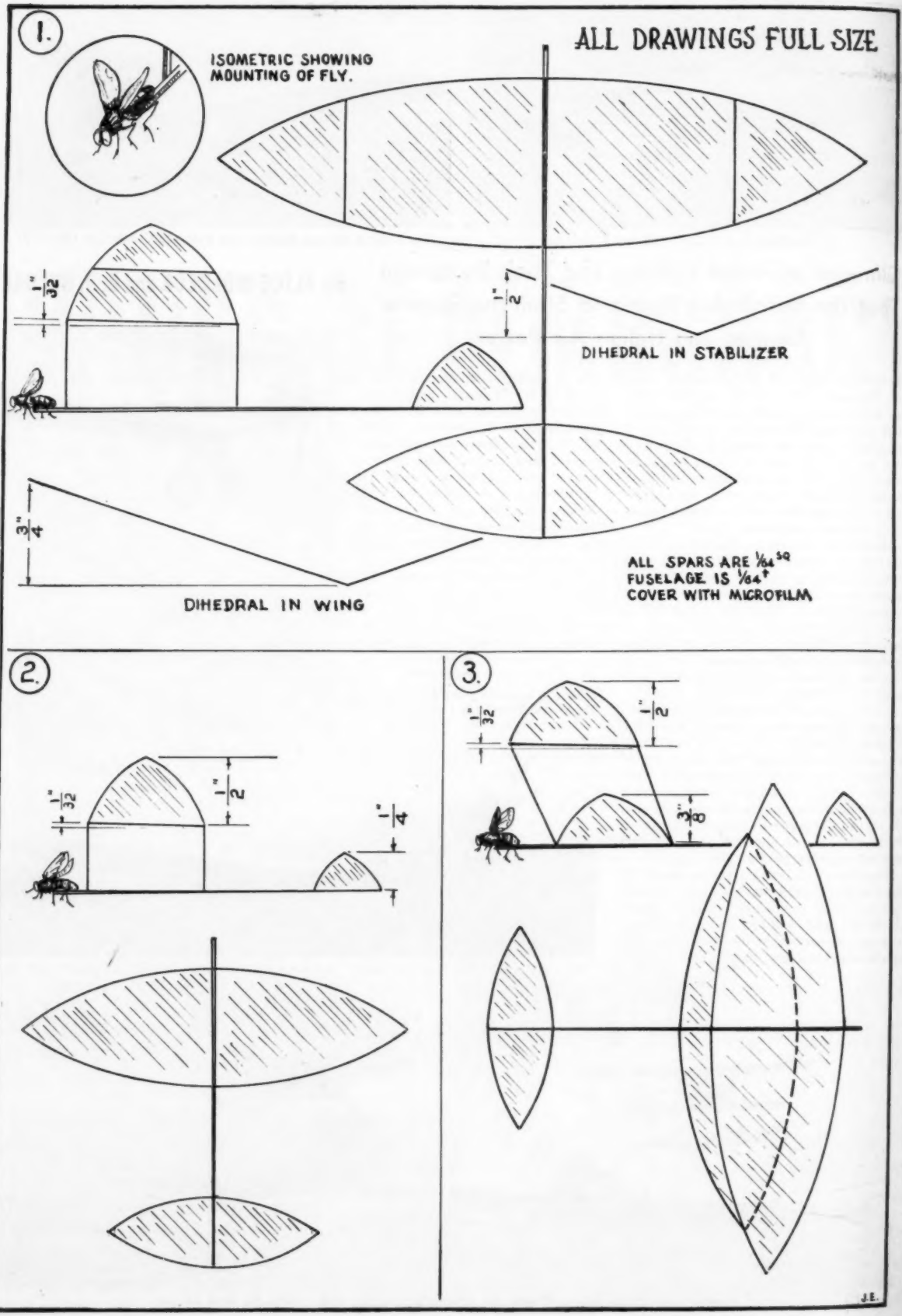
(Continued on page 67)



A British torpedo plane lays its egg. These are being used against German naval craft. (Internl.)

The 300 m.p.h. Caudron "Cyclone" fighter with only 450 hp. It mounts a shell gun

A baby scout plane takes off from its submarine mother ship. Note the deck hangar


1.
ISOMETRIC SHOWING MOUNTING OF FLY.
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1" 32
1" 2
DIHEDRAL IN STABILIZER
3" 4
DIHEDRAL IN WING
ALL SPARS ARE 1/64 SQ
FUSELAGE IS 1/64
COVER WITH MICROFILM
2.
1" 32
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1" 4
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1" 32
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3" 32
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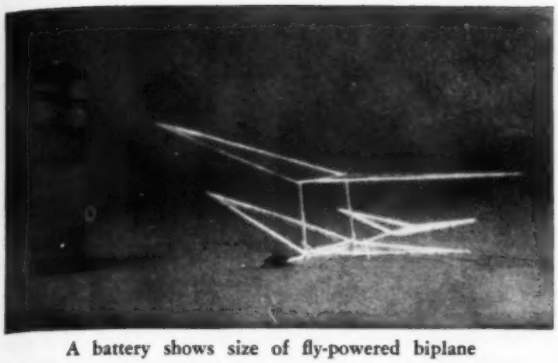
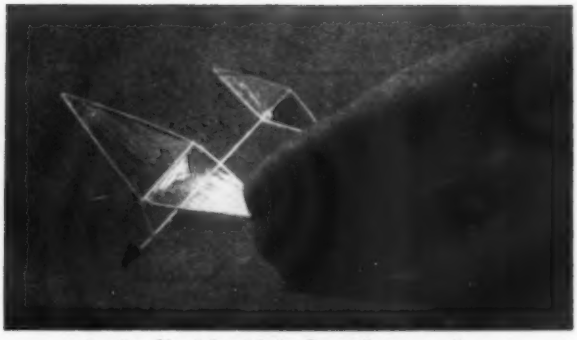


A battery shows size of fly-powered biplane



A microfilm job with its fly ready to go places

MODELS ON THE FLY

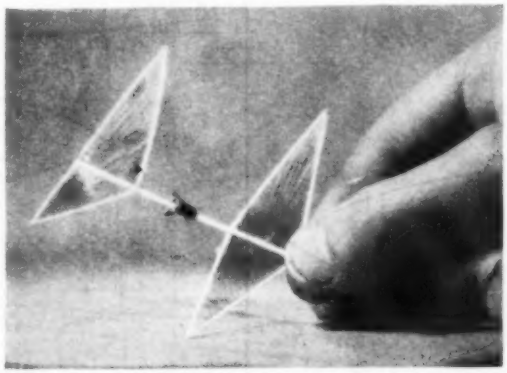
A New Source of Power for Your Model Planes—Flights of Three Minutes Have Been Made With Fly-Powered Planes of 2½ In. Wing Spread

By WILLIAM B. SCHWAB and JOE ELGIN

IF ANY of you were at the Detroit Nationals last year, you've probably found out that not all the fun was found on the flying field, but a great deal was found at the hotel where many of the contestants remained. When model (?) builders weren't busy putting airplane glue on elevator buttons, putting firecrackers in sand crocks and in shower rooms (Mr. Korda please take note), calling each other on the telephones all night, staging contests of their own (with paper planes going out of the windows), they were catching flies and gluing thin strips of Jap tissue on their tails and letting them go in the lobby of the hotel. People sitting in the lobby were amazed when they, looking up, saw a piece of red tissue cruising around in the air, first going one way then the other.

When we returned home from Detroit we wondered if it would be possible for a fly to pull up a very small glider. Well, we soon set to work building small all-balsa gliders from two to five inches in wing spread, the fly being attached to a thin strip of tissue, and in turn to the glider. We soon discovered, however, that the gliders were much too heavy; the fly buzzing in the air and the glider still sitting on the ground. Later developments resulted in a glider made from soft 1/32" squares and covered with Jap tissue. This time the plane was light enough to fly but no flights actually took place, because the towline just would not work. When the fly stopped buzzing he would drop, due to the drag of the glider and towline and the whole works would end up in a dive. Still later we built a ship five inches in wing spread from 1/64" soft sheet cut into as fine a strip as possible for wing and tail frames, the fuselage cut from the same sheet into 1/64" square, tapering towards the tail. The wing and tail was covered with microfilm and the fly attached directly to the fuselage or stick with a small drop of airplane cement. In this way we could get the plane to climb under power and then, when the fly cut off, the plane would continue on a slow glide. Nine times out of ten the fly would start up again before the plane landed and the flight was repeated.

Before we got our final product we experimented with bimotor and trimotor jobs, but to no avail. Our first drawback was finding flies of the same size and power, then, too, we found it's just impossible to get the engines synchronized; first one would start, then the other, each time resulting in a spin one way or the other. Course we've never tried them in tandem. On one of our latest developments we made a ship of only two and one-half inches in wing spread and powered it with a smaller fly. Believe it or not, the fly, being lighter, would deliver more horse (fly) power per weight than a large fly would. Result—a smaller plane with a smaller fly—a better climb and a better glide and flights of over three minutes duration indoors in our own living room, where the climb was limited. The flight ended when the fly managed to flip and land on the ceiling. On one occasion we took a ship outdoors in the evening and let it go, only to have it go out of sight overhead in about fifteen seconds. It's probably still flying, or maybe the fly is having lunch on some garbage can before he continues on his "flight."

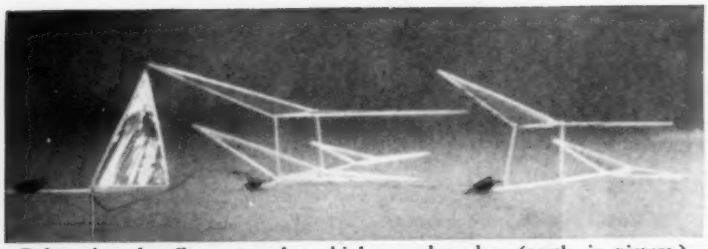


The fly is attached to the stick between the tandem wings by an infinitesimal amount of cement

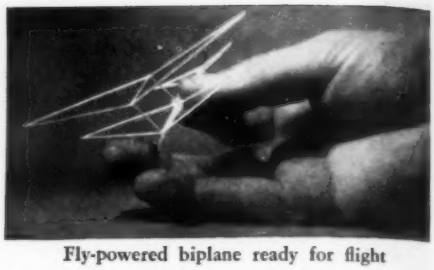
The construction of these little ships is very simple and needs no or little explanation. The cost of these ships is negligible, the main item being a small bottle of microfilm solution for covering.

In the accompanying drawings we have several types of ships which we have built and flown successfully. Although the instructions here will undertake explanation of only one ship, you can make your choice of which you want to build, the other ships being quite the same in construction. The plane shown in drawing number two (2) is the one which will be explained in the forthcoming paragraphs.

If you care to make your own microfilm use a one-ounce bottle of clear dope and add about five drops of castor oil as a plasterizer, or enough so that when the film is poured on the water it will spread out and keep stretched out, not spread out and then shrink back. Otherwise you'll have too heavy a sheet. Use a bottle cap from a one-ounce bottle for a measurer and fill it half-way with your microfilm solution. When pouring, don't pour your solution all in one spot, but quickly pour over a large area, about five to ten inches across the



Before the take-off; a monoplane, biplane and tandem (partly in picture.)



Fly-powered biplane ready for flight

water; then you'll give the film more chance to spread out. We find that the bath tub is just about the best place for making our film. We once heard of a fellow going down to his model shop and buying a two-ounce bottle of microfilm solution and pouring the whole two ounces into the bath tub, resulting in hours of work for his mother, cleaning it out.

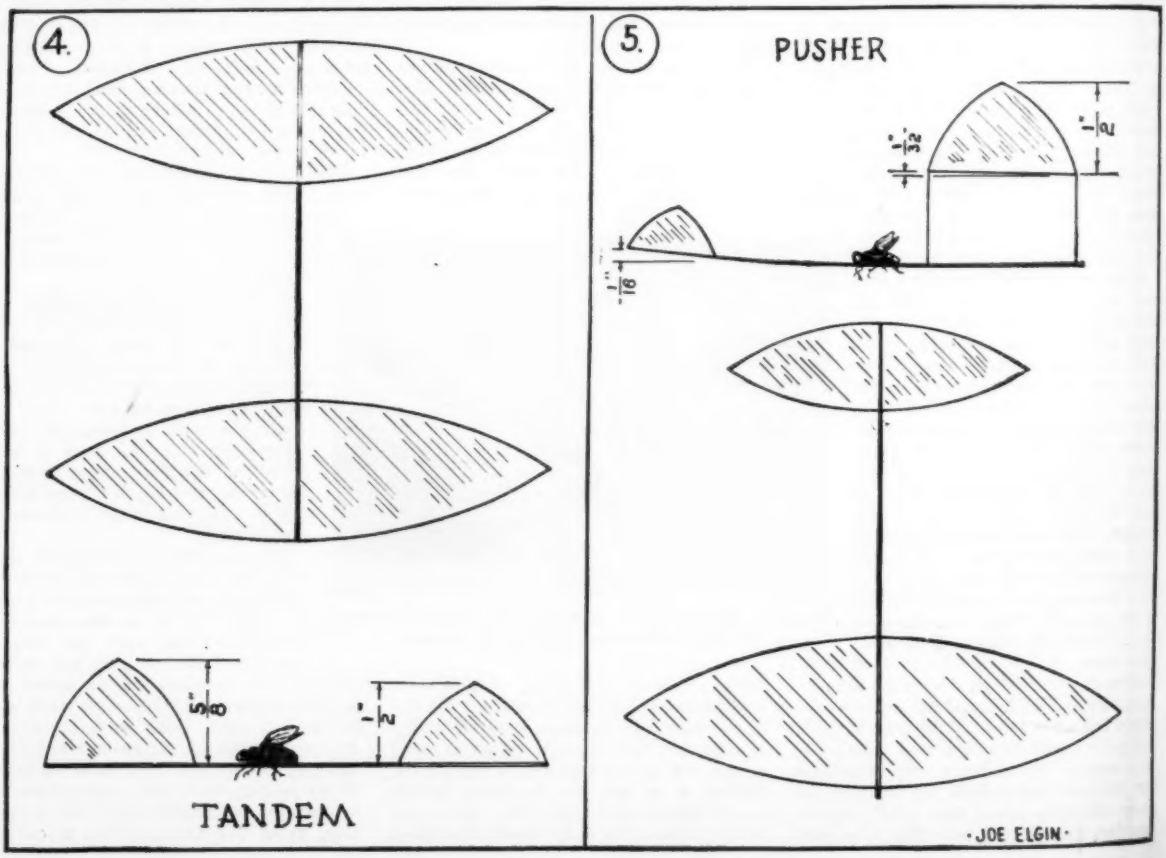
Fill your tub with lukewarm water about two inches in height. When the water is perfectly still, fill your bottle cap half-way with microfilm solution and quickly spread it over the water. Watch and see that it spreads enough; if not, add more oil; if too much, add more dope. Allow the film to dry for about a minute, then take a wire hoop (an old clothes hanger works very well) and either slip is under the film or carefully lay it on top of the film and flip the edge of the film over the wire, then carefully slip, not lift, it from the surface of the water. If you try lifting it straight up the film might break due to cohesion of the water and film. Hang the film up and let it dry. Try and get a blue film, or green and red, but don't use a colorless one, as it will be too heavy and weak.

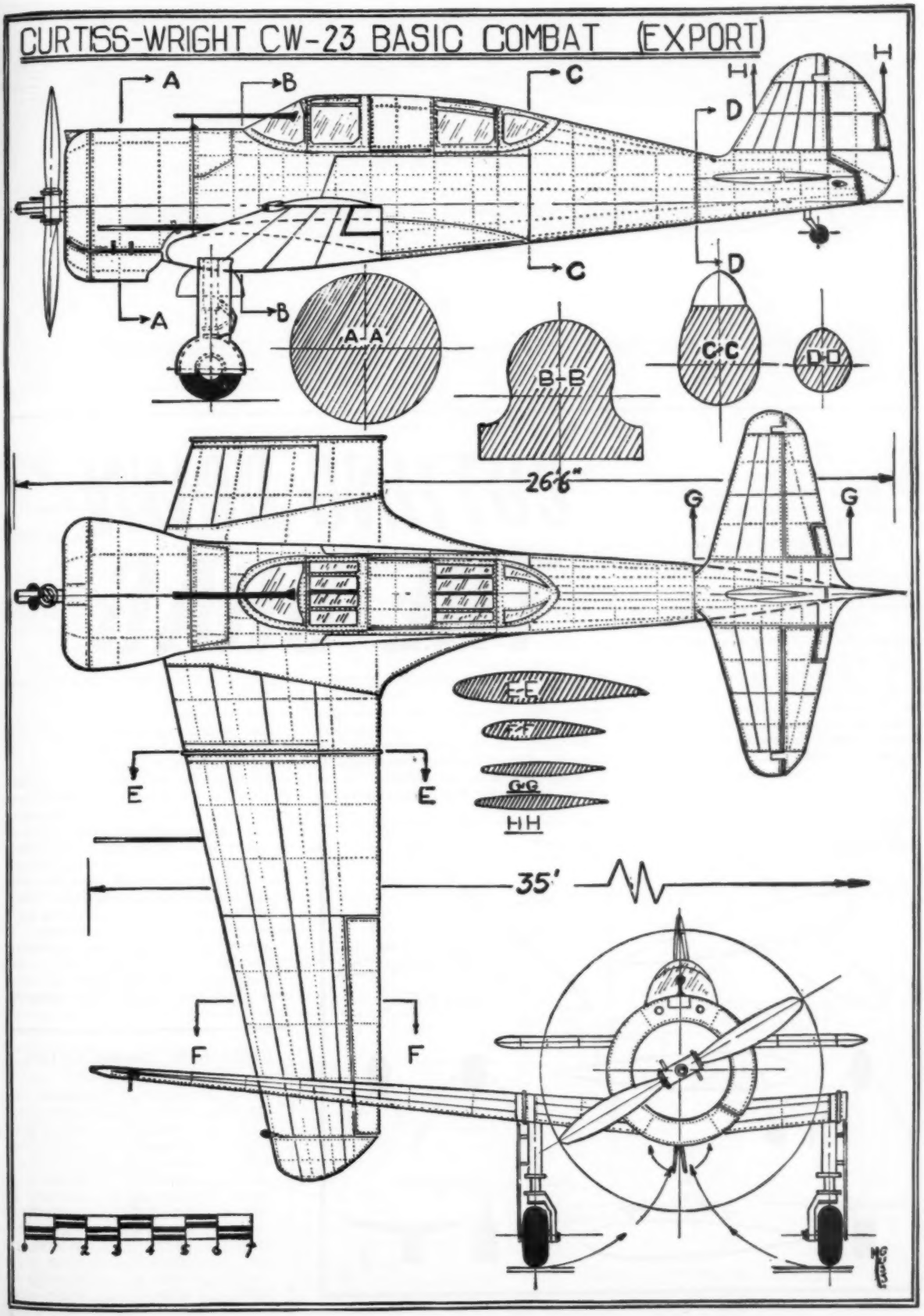
In building the wing and tail select a piece of soft white balsa 1/64" thick, and cut it into strips as fine as possible, but be sure that it has enough strength to support the microfilm covering. Pin the strips over the wing and tail drawings and put small drops of glue on the joints. After the wing and tail are dry, remove them from the plans with a sharp razor. By this time your microfilm should be ready. Wet your wing and tail frames and lay them carefully on your microfilm sheet. Then carefully, using a hot wire, "cut" away your film from the wing frame. Leave a very small section of the film holding the wing to the film sheet, until the entire wing covering has been cut away, so your covered wing will not drop down when cutting around it. After your wing and tail are covered, use a fine razor and cut in your dihedral, then apply a very small drop of glue to the joints, being careful not to touch the microfilm covering with the glue stick. You will note that there is no rudder on this particular model, instead we have the "V" type stabilizer to help make a lighter tail section.

Assembling the model requires just about one large drop of glue, applied to the wing mount and the stabilizer. Check very closely to see that the wing is not warped and that the tail section is in line with the wing; otherwise the ship will spin in.

When test gliding the model, use a very small piece of balsa about 1/8" cube for weight in place of a fly; this weight can be attached by merely wetting it and placing it on the front of the plane. Or if you prefer, use an inactive fly, but be sure and get a fairly flat glide with the weight attached. You'll find in gliding, if the model turns any it will be caused by the tail being out of line with the wing. If under power your model stalls or dives you'll find it's the way in which the fly is sitting on the fuselage, or in other words our thrust line. Don't warp the tail section if the ship glides well, but warp the front of the stick down or up as the case may be, to counteract the stalls or dives, under power. By

(Continued on page 44)




CURTISS-WRIGHT CW-23 BASIC COMBAT (EXPORT)
A
B
C
D
H
A-A
B-B
C-C
D-D
26'6"
G
E-E
E
G-G
H-H
35'
F

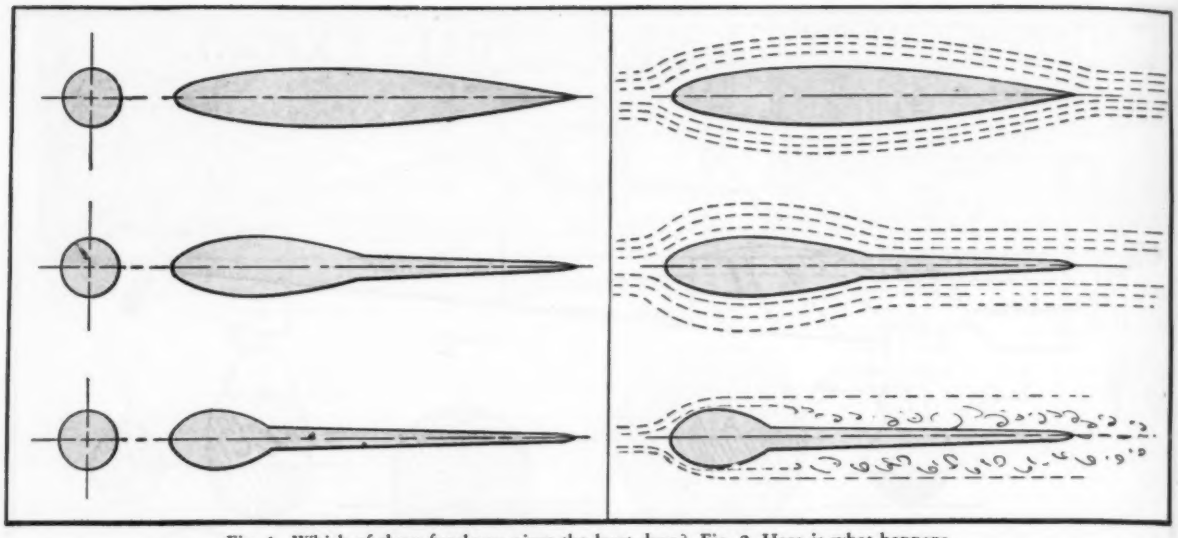


Fig. 1. Which of these fuselages gives the least drag? Fig. 2. Here is what happens

CUTTING DOWN THE DRAG

HERE at last is what gas model designers have always wished for! A complete series of tests on gas model fuselages made in a real wind tunnel, at speeds equivalent to those of actual gas model flight.

All model builders know, when designing their planes, that lift is something to be desired and drag something to be avoided. In fact, with a little more precise aeronautical knowledge, the performance of a plane can be accurately predicted if its characteristics of lift and drag are known. Unfortunately, because of the natural perversity of airplanes which is so well known to all aeromodelers, lift can be obtained only in limited amounts and by the use of special apparatus, such as wings, whereas drag is available in abundance and appears whenever any object starts to move.

Though every builder has his own ideas regarding gas model design, the fact remains that the lifting apparatus and ability of all types is more or less the same. In other words, wings are standard equipment. The great differences among models come in the quality of the streamlining which is built into other parts of the plane, especially the fuselage and its accessories. The reduction of drag is what is most needed to make a model superior to its competitors, yet it is the phase of model design which is least understood.

Thus we find some builders who advocate streamlined, monocoque fuselages, while others stick to the square box-car types and point to the fact that contest records show many victories for so-called "unstreamlined" planes. The fact is that pleasing lines and smooth appearance is not at all a measure of the amount of drag which a body will have, and that many factors other than gracefulness of lines determine the air resistance of a complicated object like a fuselage equipped with landing gear, motor, wing mount and other fittings.

In order to obtain accurate, quantitative information on the design of gas model fuselages, the following series of wind tunnel tests were made. The equipment

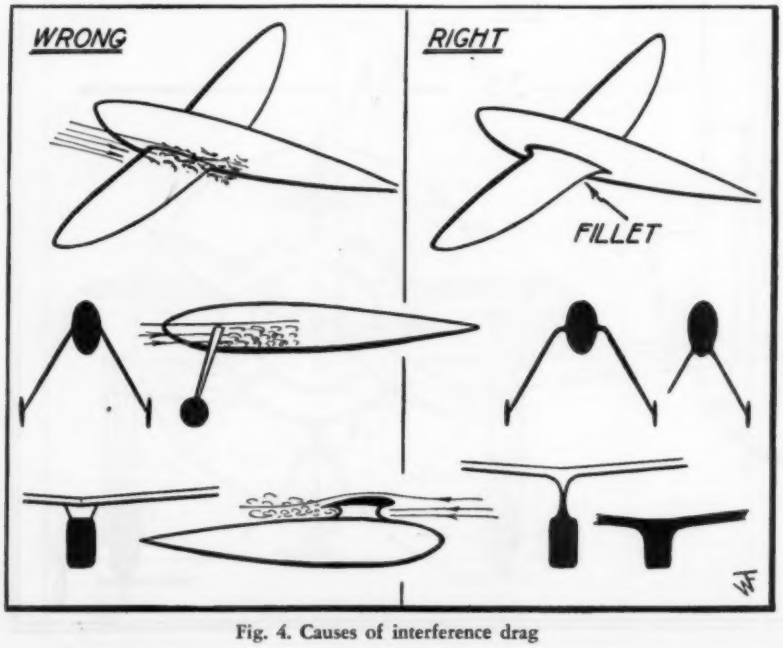


Fig. 4. Causes of interference drag

Coefficients For Diameters Of Least Drag Circular Fuselages

Station	Fuselage No. 4	Fuselage No. 7
00	00.00	00.00
5%	00.0475%	00.075 %
10%	00.066 %	00.098 %
20%	00.092 %	00.113 %
30%	00.108 %	00.103 %
40%	00.113 %	00.075 %
50%	00.103 %	00.052 %
60%	00.090 %	00.039 %
70%	00.071 %	00.0325%
80%	00.049 %	00.025 %
90%	00.025 %	00.018 %
100%	00.00	00.00

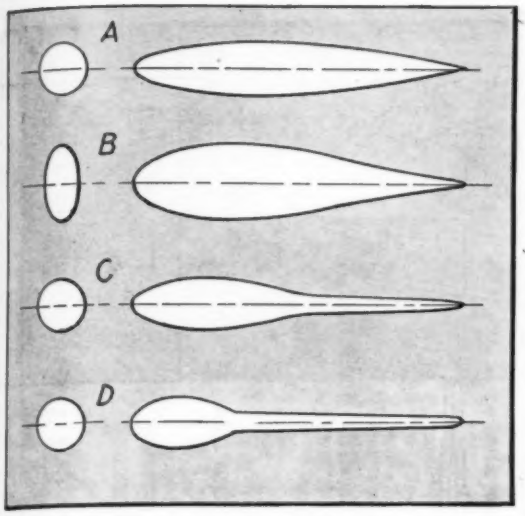


Fig. 3. Some fuselage designs

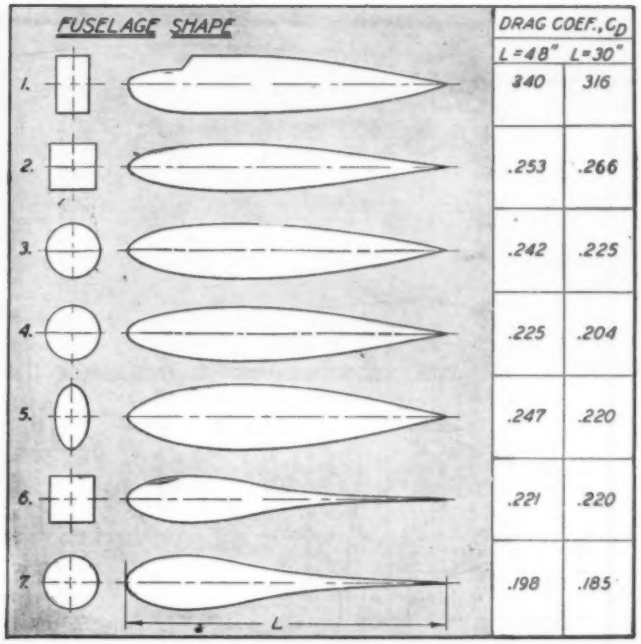


Fig. 5. Drag coefficients of fuselages

Results of Tests on Various Fuselage Shapes Run in the Mass. Institute of Technology Wind Tunnel at Speeds Attained by the Average Gas Model

By HEWITT PHILLIPS and BILL TYLER

used was the four foot tunnel of the Massachusetts Institute of Technology aeronautical laboratory. This wind tunnel was the first one to be built at M.I.T. During the early 1920's it was the best tunnel in this country, but it has long since been superseded for the testing of full sized airplanes by larger and faster wind tunnels. However, for the testing of gas models it is ideal; it gives accurate measurements at speeds ranging from 15 to 40 m.p.h. The balances used for measuring the forces on the models are extremely sensitive, allowing the detection of differences in drag and lift of as little as one-ten-thousandth of a pound.

The models used for the tests were of typical model airplane construction, accurately built and conforming to the N.A.A. rule which states that the cross sectional area shall equal $L^2/100$. All the models in a given series were of the same length and cross sectional area.

A discussion of some of the things we may expect to find from our test results will make them more useful in practical designs. In the first place, we need a clear concept of the causes of drag. Perhaps the simplest notion of this subject would be to consider air resistance as caused by the friction of the air rubbing over the surface of a body, exactly as a solid body experiences friction when it is moved about on a surface.

This explanation is indeed partly correct, but a much clearer idea of what is occurring is obtained if we recognize the fact that, because air is not solid but instead free to move, it will be pulled along with an object whenever it exerts a friction force on it. For example, it is a familiar fact that a bucket pulled behind a motorboat will experience a large amount of resistance. This is because it is dragging along a large amount of water when it moves. In exactly the same way, the drag on a body moving through the air is caused by the air which is dragged along with the body when it moves. Whenever anyone speaks of drag, what is really meant is that air is being "dragged along." A good streamline shape is one which will move through the air without trying to pull much of the atmosphere along with it.

A clear understanding of the causes of drag will now be obtained if we determine the ways in which air may be dragged along by a body. Non-lifting objects like fuselages can do this in only two ways. The first is the formation of turbulence and eddies behind the body. This process is familiar to everyone who has observed the eddies formed behind his hand as he moved it through water. A careful observation of these eddies will show that they are moving along with the object that is causing them. In other words, fluid is dragged along whenever eddies are formed, hence the drag on a body which causes a lot of turbulence is sure to be high. The drag of a flat plate moving broadside through the air is almost entirely caused by this eddy formation giving the familiar high drag of such an object.

It is an experimental fact, however, that many smoothly curved objects, of the well-known dirigible-shaped streamline form, move through the air without causing any eddies at all. Yet these bodies still experience a certain amount of drag. The reason for this, the second of the two mentioned above, is the "skin friction" of the air passing close to the body. This effect results from the viscosity of the air. A fuselage moving through the air drags along a certain amount of the gas, just as a spoon moving through cold molasses pulls along some of the liquid. The only difference between the two cases is that air is very much less viscous than molasses. Nevertheless, on smooth streamline bodies which cause no eddy formation, all of the drag comes from this latter cause.

Since this skin-friction part of the drag is caused by air sticking to the surface of a body, it would certainly be expected that this drag could be reduced by keeping the

(Continued on page 47)

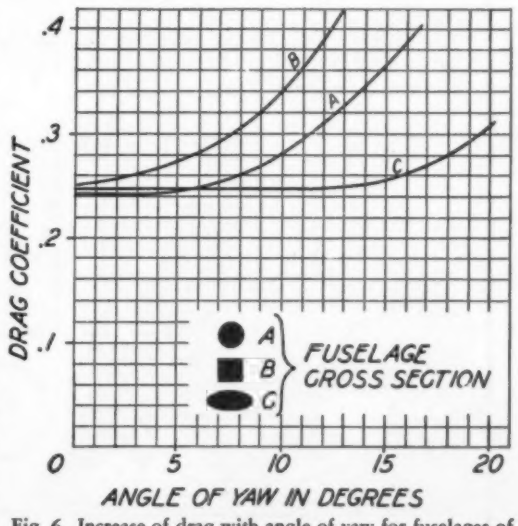
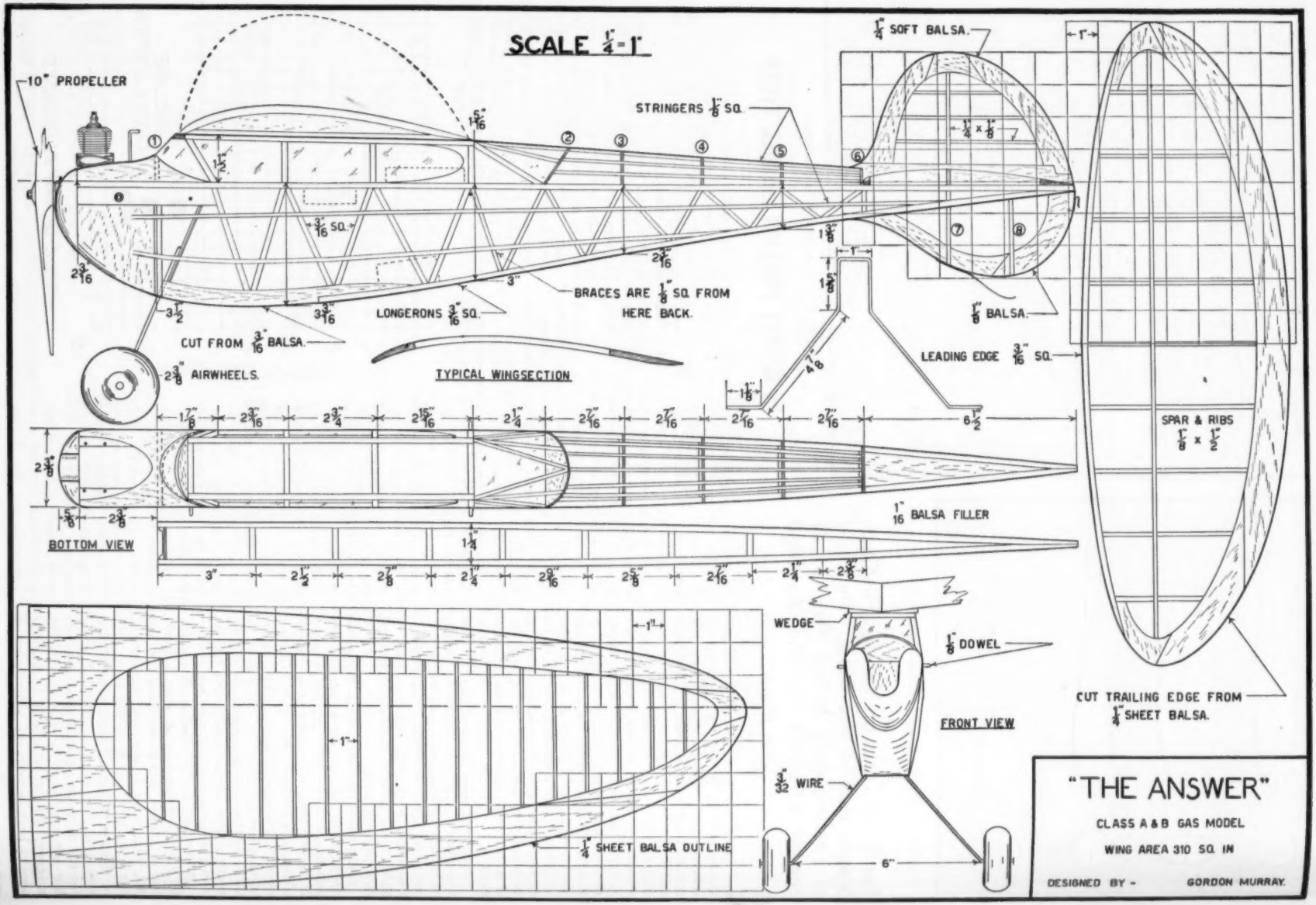
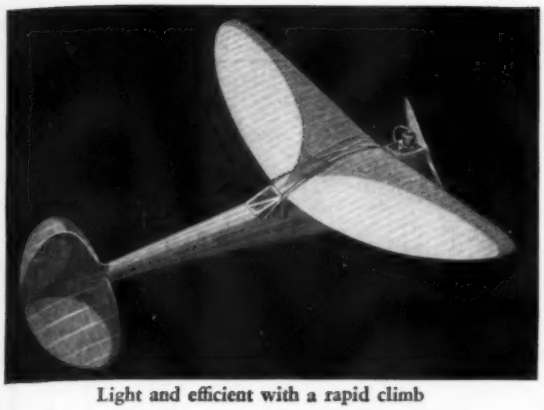
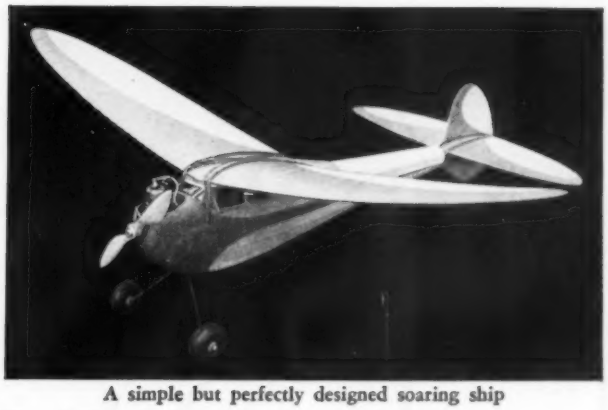


Fig. 6. Increase of drag with angle of yaw for fuselages of various cross sections


SCALE 1/4" = 1"
10" PROPELLER
STRINGERS 1/8" SQ.
1/4" SOFT BALSA.
1/4" x 1/8"
3/16 SQ.
BRACES ARE 1/8" SQ. FROM HERE BACK.
LONGERONS 3/16" SQ.
CUT FROM 3/16" BALSA.
1/8" BALSA.
LEADING EDGE 3/16" SQ.
2 3/8" AIRWHEELS.
TYPICAL WINGSECTION
SPAR & RIBS 1/8" x 1/2"
1/16" BALSA FILLER
BOTTOM VIEW
WEDGE
1/8" DOWEL
FRONT VIEW
CUT TRAILING EDGE FROM 1/4" SHEET BALSA.
3/32" WIRE
1/4" SHEET BALSA OUTLINE
6"
"THE ANSWER"
CLASS A & B GAS MODEL
WING AREA 310 SQ. IN
DESIGNED BY - GORDON MURRAY.



Light and efficient with a rapid climb



A simple but perfectly designed soaring ship

The "ANSWER" For Gas Fans

Build This Dual Purpose National Record Holder— It Can Be Flown in Either Class A or B Contests

By GORDON MURRAY

THERE are many questions in the mind of every potential builder of a Class A or B gas model. How big shall his ship be? Which class will it fall under? What airfoil shall be used? Shall it be streamlined?

The questions could go on for a fortnight, but in these paragraphs we present "THE ANSWER" . . . which will give the perplexed builder a solution to his many problems in one of the most consistent, best performing little planes in the gas model field today.

When the 1940 gas model rules were announced by the Academy of Model Aeronautics they gave a definite "break" to the Class A builder in that they erased the limitation on wing area. Therefore, it was theoretically possible for a builder to construct a plane for EITHER Class A or B, the simple change of a motor making the ship available in either class. In "The Answer" the builder will find such a ship . . . use an engine of 0 to 1.99 cu. in. displacement in Class A or a 20 to 30 cu. in. displacement engine in Class B and be a winner in either class.

Performance? The first day "The Answer" was flown it gave evidence of superior performance. It was entered in the Class A-B meet of the Metropolitan Model Airplane Council and despite the lack of thermals the little ship turned in an average of 1:50 to take top honors in its class, and incidentally to establish a Class A 1940 record that still stands. Under daily flying conditions, with better weather, it has several times done over five minutes.

The design of the ship has proven extremely adaptable to various classes. When "scaled up" 1½ times The Answer proved to be fully as fine a performer as a Class C ship, establishing an officially-timed average of 8:36 with a Dennymite. The record has been forwarded to the AMA for certification.

Building "The Answer"

First, the plans must be "scaled up" to actual size. All plans on Plate 1 have been drawn quarter-scale so the builder must enlarge these plans four times. The model builder with plenty of cash may use expensive drawing paper for this, but the plans done on a sheet of brown paper (from the butcher shop) are just as workable and usually do not adhere so closely to the cement used. The wing and tail are elliptical in shape. The standard method of laying out an ellipse may be used, or the 1" squares may be drawn and the builder may then form the outline by following Plate 1.

The Wing

The wing used on The Answer is conceded to be the secret of the entire ship: It combines high lift with a maximum of efficiency. Say what you will, it has been proved to the satisfaction of the most critical builder that this wing really "has the stuff." Once you've built one, you too will be intrigued with the possibilities and will probably be trying this type of wing on other models.

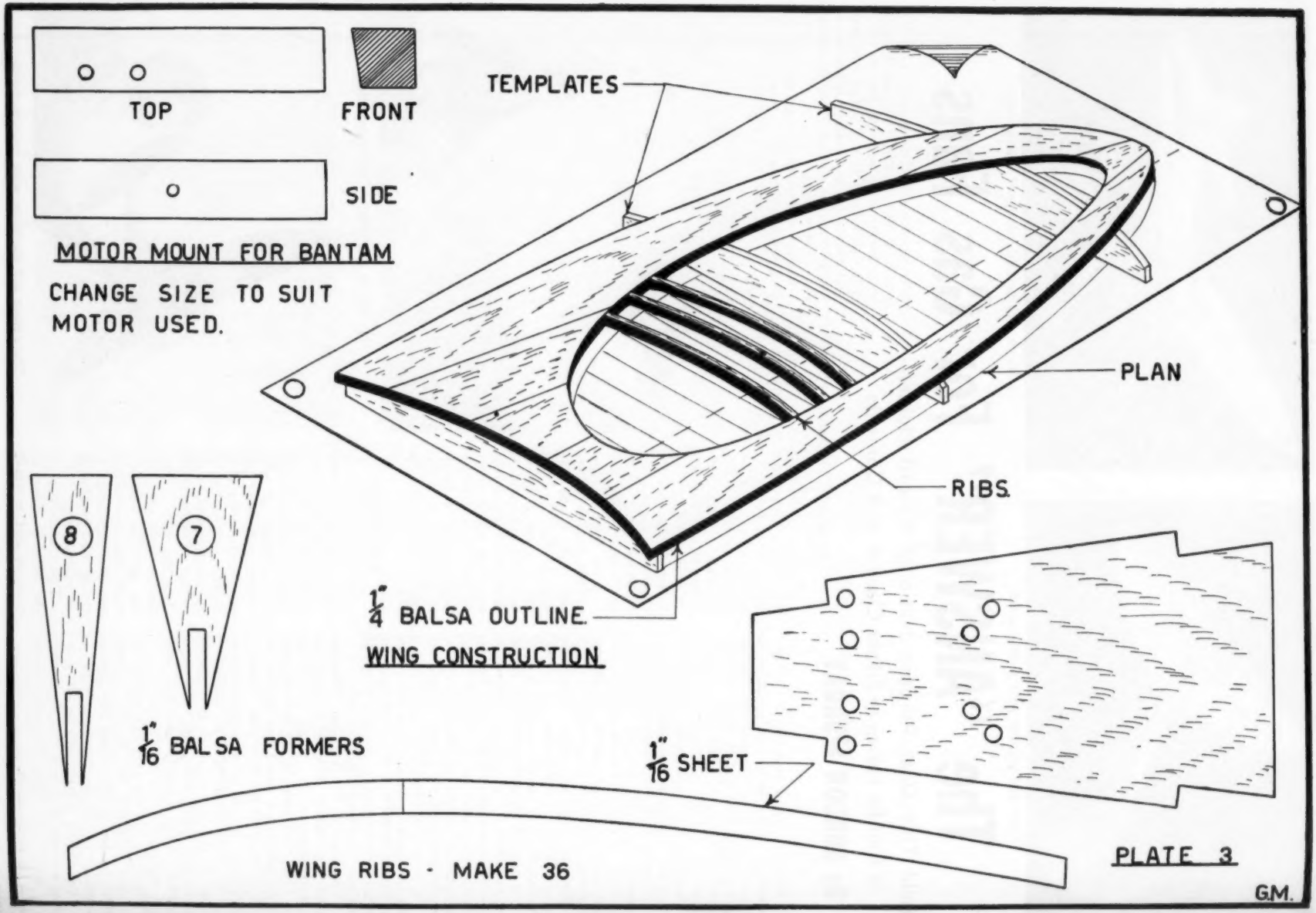
The construction of the wing is shown on plate 3, and is really very simple. The first step is to cut the outline from soft quarter-inch sheet balsa. Four sheets, 2 inches wide and 36" long will suffice for this step. You will note that the leading and trailing edges are in one piece, joints coming at the tip and at the center section.

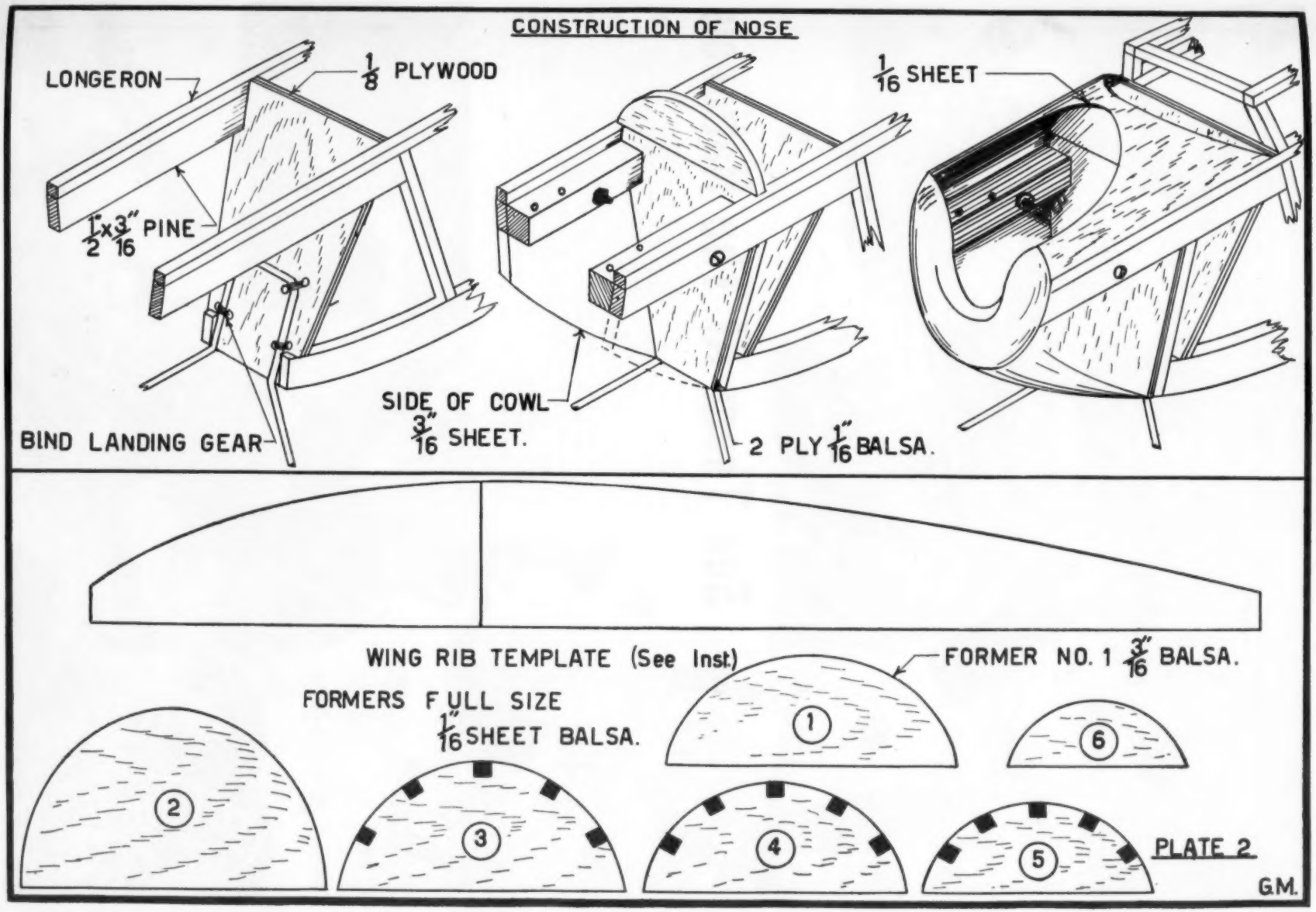
Cement the sections together and let dry thoroughly. Next cut wing rib tem-

(Continued on page 59)

The ship in flight shows great stability

The author and the plane with sparless wings


TOP
FRONT
SIDE
MOTOR MOUNT FOR BANTAM
CHANGE SIZE TO SUIT MOTOR USED.
TEMPLATES
PLAN
RIBS
8
7
1/16 BALSA FORMERS
1/4 BALSA OUTLINE
WING CONSTRUCTION
1/16 SHEET
WING RIBS - MAKE 36
PLATE 3
G.M.


CONSTRUCTION OF NOSE
LONGERON
1/8 PLYWOOD
1/16 SHEET
1/2 x 3/16" PINE
BIND LANDING GEAR
SIDE OF COWL
3/16" SHEET.
2 PLY 1/16" BALSA.
WING RIB TEMPLATE (See Inst.)
FORMER NO. 1 3/16" BALSA.
FORMERS FULL SIZE
1/16" SHEET BALSA.
1
2
3
4
5
6
PLATE 2
G.M.

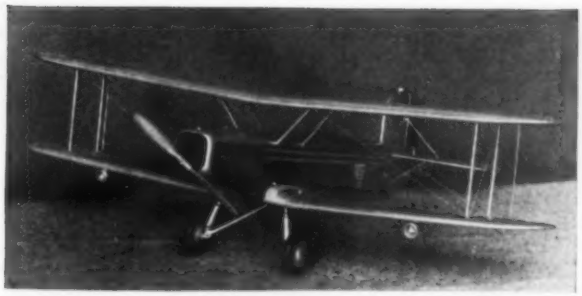
See Them At The Nationals

1. George Gilchrist with his 30" tailless pusher. 2. Leon Shulman, one of the first one-wheel advocates. 3. Henry Struck's latest creation is composed of an egg-shaped body, a boom and gull wings. 4. A beautiful Class A job by Jack Janesik. 5. Tom Mountjoy's plane, complete with detailed cockpit and instruments. 6. Sal Taibi with his Class C powered soarer. 7. Jack Schreder's ship is completely covered with cellophane. Strips of Scotch tape repair it quickly. 8. Dick Everett took two firsts, Class A and B, at the Queens City meet. Bill Effinger presents trophies. 9. A stunt model pulls a trailer banner at the Queens City meet. 10. Louis Garami's latest 30" parasol. 11. Tom Mountjoy glides his plane. 12. The motor and landing gear of Mich Beachem's plane is a single unit. 13. Dick Berkenhead with the first folder "gas" propeller. 14. Joe Raspanti smiles confidently on his new 12' radio control plane's stabilizer. 15. Conrad Steigenwald's beautiful pusher flying boat, with adjustable stabilizer. 16. Bob Hayes increases the climb of his model with Handley Page wing slots.

GAS LINES

AIR WAYS

NEWS OF MODELS AND BUILDERS FROM ALL PARTS OF THE WORLD



Pict. 1. Paul Robertson's miniature Douglas Mailplane

HERE we are again at the Nationals! the "cream of the crop" of expert model builders, ready to measure our skill against one another!

MODEL AIRPLANE NEWS wishes to welcome all Nationals' contestants to this classic event.

It is to be regretted that only a comparatively small number (about 1100) of all the model experts in America, which totals 100,000, are able to attend and enjoy the comraderie that pervades all the activities. Great benefits can be enjoyed by all contestants; the many contacts and exchange of ideas are bound to result in future friendships and a broader outlook and understanding of all aviation matters, as well as model technique. Though some may reach the first stages of insomnia, due to nightly vigils at the model workbench, this will be compensated for by four days of healthful activity in the fresh air and sunshine. In fact this is one of the advantages of model airplane flying over other forms of model activity.

Pict. 2. James Dick's Douglas coming in (on wires)

To those who do not have the good fortune to attend the Nationals, in our next issue we will give a vivid and accurate account of all that takes place. As a preview, we present the group of pictures appearing on the preceding page. They are intimate "shots" of prominent builders and noteworthy planes, most of which will be seen at the National Championship. Conscientious work and building may place you in the position to attend future national contests and may even lead to higher achievements in the field of aviation in years to come. Therefore do not despair if you cannot be on hand to "greet the boys" at Chicago this year.

Pict. 4. Result of fine work with a 10c kit

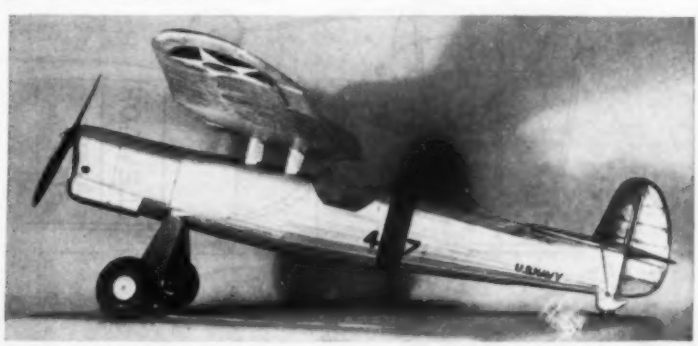
Pict. 3. Believe it or not!

A number of interesting ideas have been received which we will attempt to describe. Way back in the August 1935 issue of MODEL AIRPLANE NEWS a set of plans of the Douglas Mailplane, by Willis Nye,

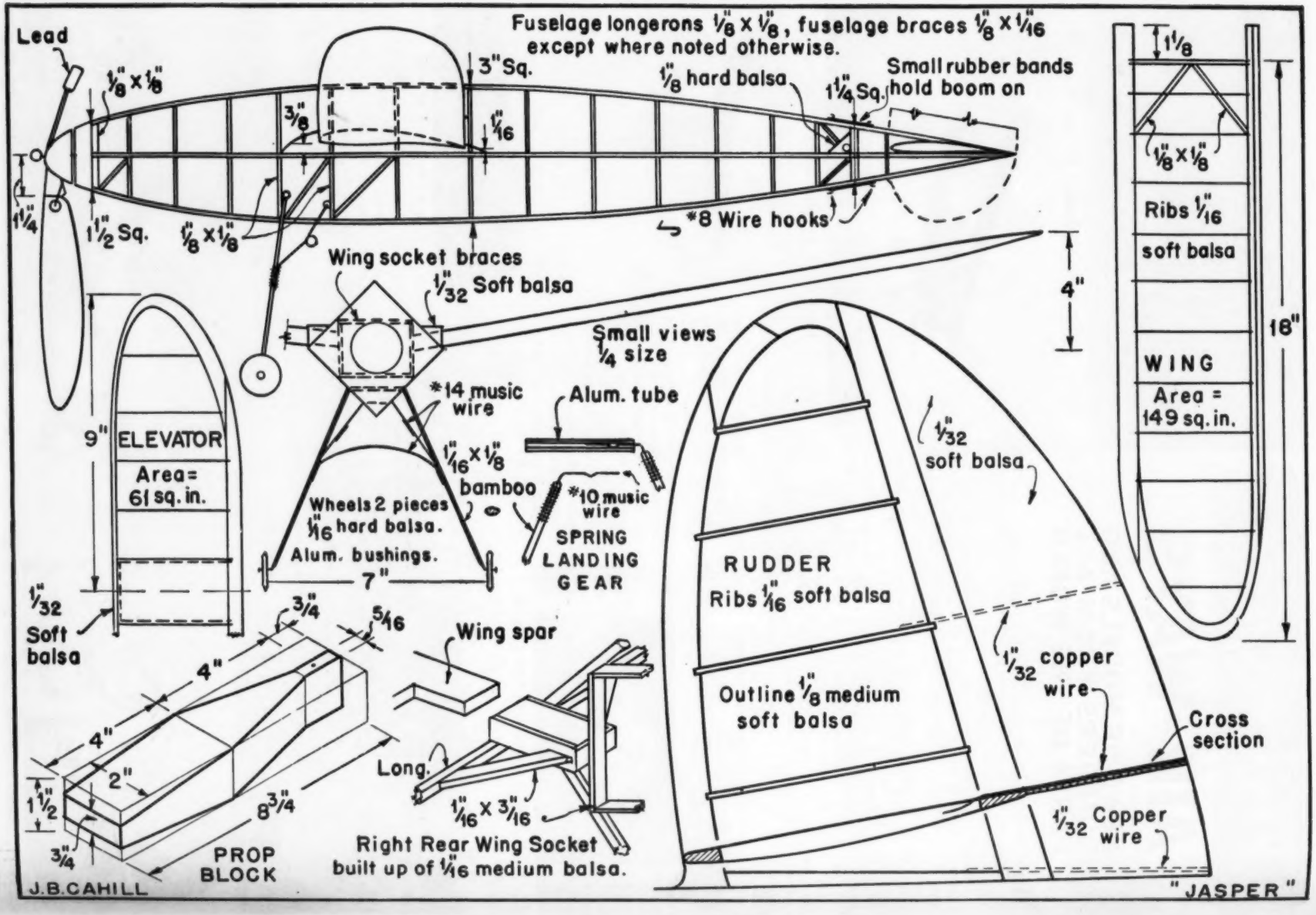
(Continued on page 50)

Pict. 5. The Thermal Riders of LaCrosse, Wis., with their winged steeds

Pict. 6. Charles Koby wins Aeroneer Trophy



Pict. 7. A beautiful and efficient semi-scale job by Peter Westburg


Fuselage longerons 1/8 x 1/8, fuselage braces 1/8 x 1/16 except where noted otherwise.
Lead
1/8" x 1/8"
3" Sq.
1/8 hard balsa
1 1/4" Sq.
Small rubber bands hold boom on
3/8"
1/16"
1 1/4"
1 1/2" Sq.
1/8" x 1/8"
*8 Wire hooks
Wing socket braces
1/32" Soft balsa
4"
Small views 1/4 size
*14 music wire
Alum. tube
1/16" x 1/8" bamboo
*10 music wire
Wheels 2 pieces 1/16" hard balsa.
Alum. bushings.
7"
SPRING LANDING GEAR
9"
ELEVATOR
Area = 61 sq. in.
1/32" Soft balsa
3/4"
5/16"
Wing spar
4"
4"
2"
1 1/2"
8 3/4"
3/4"
PROP BLOCK
J.B.CAHILL
Long.
1/16" x 3/16"
Right Rear Wing Socket built up of 1/16" medium balsa.
1/32" soft balsa
RUDDER
Ribs 1/16" soft balsa
Outline 1/8" medium soft balsa
1/32" copper wire
Cross section
1/32" Copper wire
"JASPER"
1 1/8"
1/8" x 1/8"
Ribs 1/16"
soft balsa
WING
Area = 149 sq. in.
18"

"Jasper" CAN WIN THE WAKEFIELD

How to Build the Latest High Performance Super-Wakefield Model Designed by an Ace Model Champion

By JAMES B. CAHILL

The finished model with propeller folded

WITH model building, as well as with any other hobby, designs seem to come in cycles, for until 1936 most of the outdoor model builders tried to get a fairly long motor run on their models. Then in the Nationals that year at Detroit the Tulsa boys, led by Dague, Wriston and Luckett, broke through to phenomenal success with their high rate of climb and short motor runs. This performance induced a wave of contest models which leaped off the ground and hurtled toward the clouds at a rapid pace. The Chicago Aeronuts took up this technique where Tulsa left off and found their ships riding the thermals. Motor runs as short as twenty-five seconds were not unheard-of.

Now it looks as if the cycle has reached its turning point and has already started on its downswing. A few of the model builders are starting again to work to get added seconds to their motor run. It is well to remember, though, before you go to extremes, that you must have enough "soup" to climb the plane out of ground disturbances immediately after take-off. With longer motor-runs your ship should get at least as much altitude as it would with short motor run.

This ship, "Jasper," shows the growing tendency toward the longer motor run, as in actual flight it has been clocked consistently at 1:15 when the propeller folds, and there are still a few winds left to keep tension in the motor. This model was built in August, 1939, so it has not been in many contests. Its first morning's trials were ended at 6:30 A.M. by a 3:10 flight ending in a treetop. "Jasper" was in its best trim during some trial flights in Akron before the Scripps-Howard Nationals, where, after 6:30 in the evening, it turned in two consecutive flights

The model in full flight has a steep steady climb and great soaring ability

of 3:30 and 3:50 in practically a dead calm. The only contest where "Jasper" really had a chance to show its stuff was at the Purdue Aeromodellers contest in mid-October. On the first flight of this contest it went out of sight at 3:25. A twenty m.p.h. wind helped to keep any other ships from going out of sight that day. "Jasper" was found three weeks later in a beanfield nine miles from the scene of battle.

This ship is relatively simple to build. A flat-sided fuselage, one-bladed propeller, and no center spars in wing or tail help to make construction easy. The diamond fuselage design fairs very nicely into the wing and tail. The propeller should fold flat against the top side of the fuselage. Although we had some doubts as to the ability of the wing mounting to "take it" because the wing is fastened rigidly, we believe now that it is a practical method. The British have been using this type of wing mounting on their Wakefield models for several years. "Jasper" has hit the ground and other obstructions at full speed and the wing has yet to be broken. The landing gear on "Jasper" was "swiped" from an older model when in a hurry to complete the ship. A wire landing gear may be substituted very easily for the one which was used.

Clean design and simple construction give fine performance

Wing

Use an aluminum template to cut out the ribs. Use soft 1/16" sheet balsa for all the ribs except the two adjacent to the fuselage, which are cut from hard 1/8" stock. Spars are of medium-hard balsa. On the inside of the ribs adjacent to the fuselage, the spars are left in rectangular cross-section so that they will fit into the sockets in the fuselage.

Tail

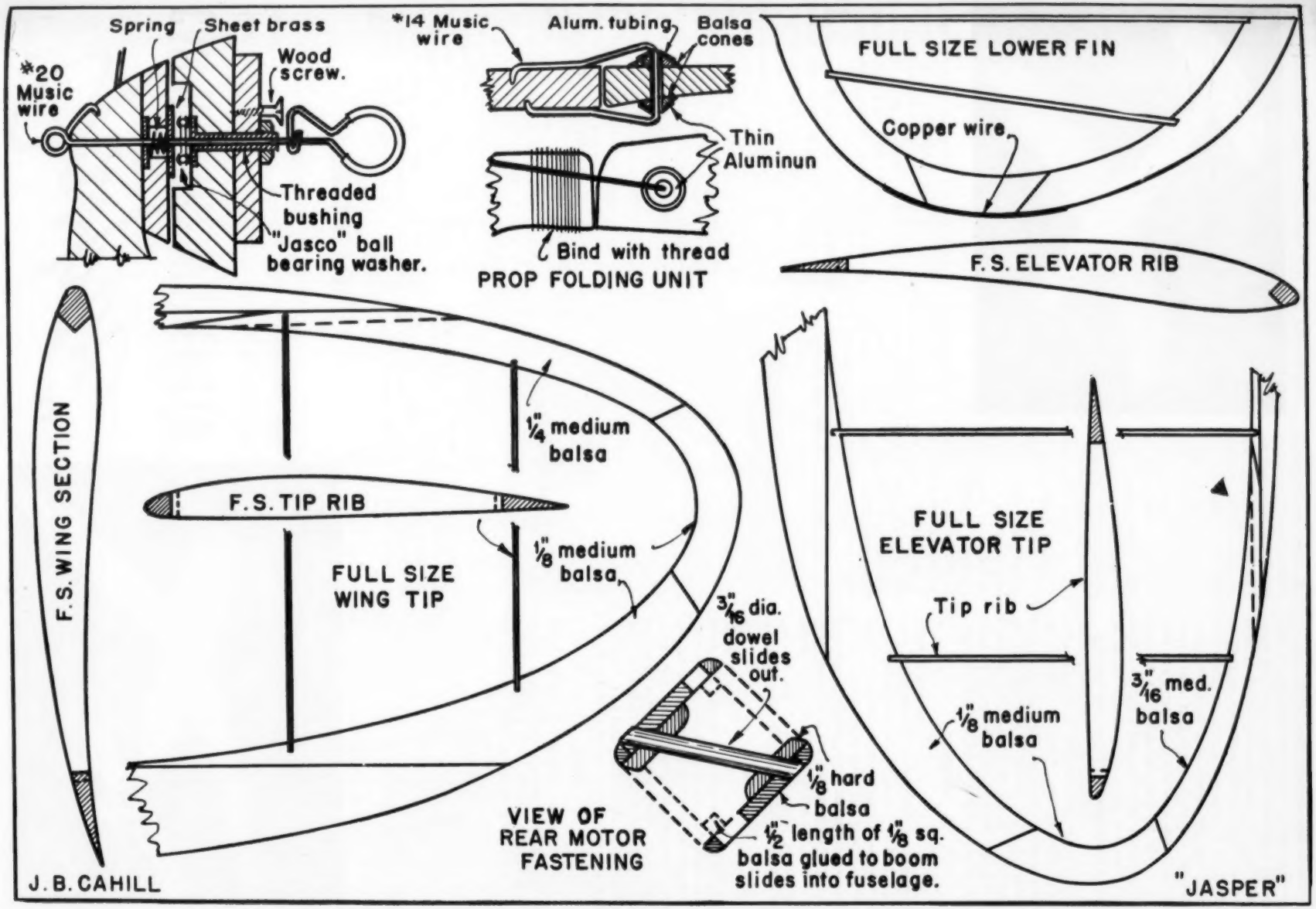
Elevator and rudder construction are just like the wing. Use soft 1/16" balsa ribs and medium-hard balsa for spars. Use soft 1/32" sheet over the two middle ribs in the stabilizer to strengthen it and make it easier to fair in the paper from the fuselage covering. Use soft balsa for the moveable portion of the rudder and dope this part with plasticized dope to prevent it from cracking when you bend it.

Fuselage

Longerons are medium-hard balsa and most of the braces are medium-soft balsa. Conventional practice is followed, building the fuselage as if it were square, then turning it on edge. A dowel-rod is used to hold the motor in the rear. The aluminum tubing in which the landing gear fits is bound squarely to braces by thread.

Block up the fuselage accurately on a corner when gluing the elevator in place. The wing sockets are built up on their respective spar stubs to insure a close fit. After the glue has dried, slide them on the stubs to make sure they slide smoothly without sticking. Leave the sockets on the stubs, then insert the whole assembly in the proper place on the fuselage, blocking up the wing to the proper dihedral and incidence. Tack the sockets to longerons and braces with a thin coat of cement. Use strips of

(Continued on page 46)


Spring
Sheet brass
*20 Music wire
Wood screw.
Threaded bushing
"Jasco" ball bearing washer.
*14 Music wire
Alum. tubing
Balsa cones
Thin Aluminun
Bind with thread
PROP FOLDING UNIT
FULL SIZE LOWER FIN
Copper wire
F.S. ELEVATOR RIB
F.S. WING SECTION
1/4 medium balsa
F.S. TIP RIB
1/8 medium balsa
FULL SIZE WING TIP
3/16 dia. dowel slides out.
1/8 hard balsa
1/2 length of 1/8 sq. balsa glued to boom slides into fuselage.
VIEW OF REAR MOTOR FASTENING
J. B. CAHILL
FULL SIZE ELEVATOR TIP
Tip rib
3/16 med. balsa
1/8 medium balsa
"JASPER"

Academy Of Model Aeronautics

A Division of the National Aeronautic Association

OFFICIAL MODEL AIRPLANE NEWS FROM ALL PARTS OF THE WORLD

THE governing body for model aviation in America is the Academy of Model Aeronautics, a division of the National Aeronautic Association. The Academy was established in 1934 by a group of leaders to foster scientific advancement in model aeronautics, give recognition to model leadership and to provide guidance and direction of national model aeronautic affairs by those individuals, who, through their accomplishments in the model field, have demonstrated their qualifications for such responsibility.

The Academy is a non-profit organization made up entirely of active model builders and leaders and supported by their memberships. As the officially-recognized aeromodeling governing group for the United States, it is the representative of the world-wide governing and sporting body, the Federation Aeronautique Internationale.

In its original state the A.M.A. was a rules making body, acting in an advisory capacity to the N.A.A. and its Contest Board in the matter of national competition regulations. During the past six years when the growth of model aviation in America has been rapid, the model builders demonstrated their abilities to guide themselves.

In recognition of this, all official modelplane activity which formerly was carried on by the N.A.A. through its Model Division has been turned over to the Academy, and the A.M.A. is now concerned with extending and promoting model aviation throughout the country.

Academy Objectives

Main objectives of the new Academy are to advance model aeronautic progress by fostering scientific research, disseminate the information obtained from such studies and encourage more competition flying. By the appointment of qualified Contest Directors to conduct sanctioned competitions, each A.M.A. member has a greater opportunity than ever before to compete in well-run modelplane meets.

By uniting all model flyers, the Academy is able to carry out the coordination of aeromodeling activities so that each affiliated flyer receives a number of benefits which could not be obtained if the modelers were not banded together in their own organization.

Individual membership in the A.M.A. is in the form of competition and leader membership. Competition members are either rubber model flyers paying dues of 50 cents a year or gas model flyers paying dues of $1 a year. Leader members hold the scientific, administrative or industry grade and pay dues of $2 a year.

Official activities are also conducted through groups recognized as Academy chapters. Chapter members hold individual competition membership; also affiliated with the Academy are organizations of large membership whose flyers are in the novice class.

Rubber model competition members receive credentials which include an official Academy card, the distinctive bronze Academy lapel emblem pin, a colorful duo-duty emblem decal, and a personal copy of the official regulations governing the flying of model aircraft in the United States. Gas model flyers, in addition, receive a set of decal license numerals for their models—their lapel pin is silver. Leader members receive a copy each month of MODEL AVIATION, the printed bulletin of the organization, a copy of the quarterly JOURNAL OF THE ACADEMY OF MODEL AERONAUTICS, as well as a certificate of membership suitable for framing and gold Academy lapel emblem pin.

One of the most important contributions the A.M.A. makes to model airplane progress is the publicizing of national rules to govern the type of model aircraft eligible to enter sanctioned competitions and the method of procedure to conduct such meets. These official rules are in use throughout the nation, and form the basis of Canadian regulations to cover activity in that country.

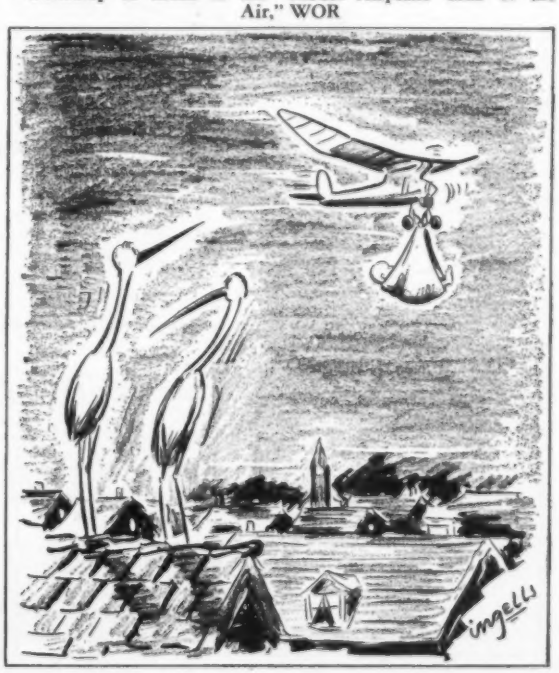
Since the model aviation sport is a progressive one—one that demands continual changes because of yearly advancements—the official competition rules are revised and brought up to date in such categories as is necessary. To do this the Academy holds several annual and semi-annual sessions as well as ballot-by-mail votes to decide on new regulations and classes for contest flying. The aim of the Academy is to keep the sport "of, by and for" the builder and flyer and to make regulations as broad as possible to encourage new designs and innovations in the types of models built and flown, while at the same time formulating the regulations so as to make possible computation of national records through comparable performances by contest craft.

Academy Policies

Academy policies are determined by the leaders of the organization and executed by a headquarters staff under the direction of the officers. The staff is made up of the Secretary and assistants. Academy officers, committee and council members, other than

(Continued on page 63)

Future champions of the Kresge Aero Club relax in the club workshop to listen to the "Model Airplane Club of the Air," WOR



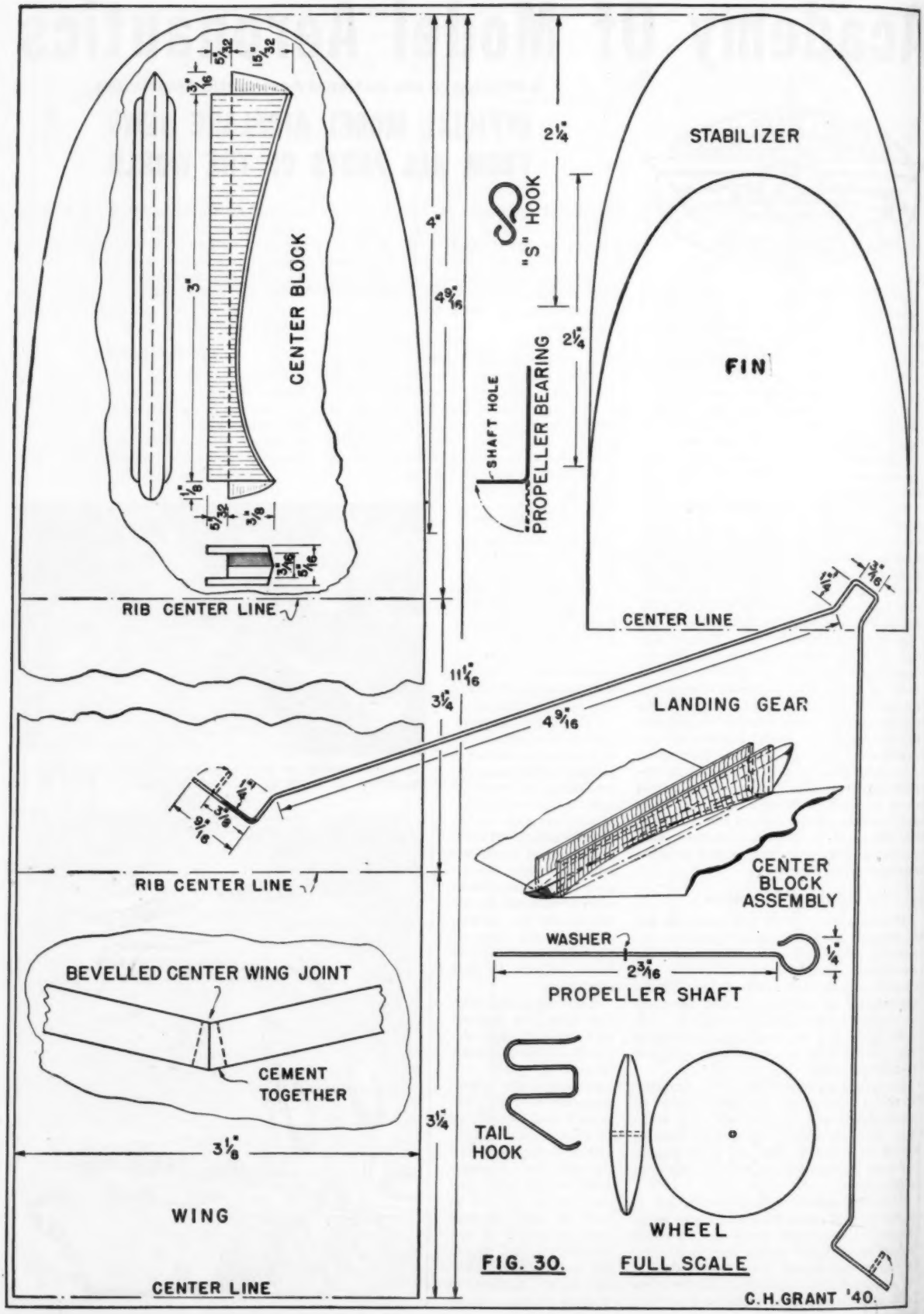


FIG. 30. FULL SCALE

Chapter 2—Article 13

By

CHARLES HAMPSON GRANT

FUNDAMENTALS OF MODEL PLANE DESIGN

How to Design Your First Power Driven Model Plane—Making Parts and Assembling the Model

IN PRECEDING articles of this series it has been explained how to design and lay out plans for your first power model. From these, full size patterns should be made.

Now the point has been reached where you actually start to put your "brain-child" into concrete form. If you have not built a model plane before, or have not acquired a certain amount of craftsmanship, you should proceed with care and accuracy, carrying out each operation explained herein with great precision. Naturally your skill will increase after you have completed a few of the first and simplest of the operations In other words, unless you are expert at model building, compensate for your lack of skill with carefulness.

In starting to build this model it will be assumed that you have made the full size patterns from the reduced scale layout, as explained in the last article. Be sure to make these patterns if you have not done so.

The first step in actually constructing the model is to cut the sheet of balsa to the correct outline, using the wing patterns shown in the accompanying drawing. The sheet of balsa should have a length of about 22-1/4" and a width of 3-1/8". You will notice that this width is a little more than the chord of the wing. This is required inasmuch as the sheet will be curved and about 1/8" of length must be absorbed.

After the outline is cut according to the pattern, the wing tips being curved properly, the next operation is to sand down the surface of the balsa wood on the under side so that it is very smooth. This should be done with fine sandpaper over the entire surface.

Now turn the wood over. On the top, round off the leading edge with coarse sandpaper. The wood should be thinned down carefully from the front to a point about 1/2" back from the leading edge. Also sand down the trailing edge of the balsa sheet. This edge should be thinned down to a blunt knife-edge rather than rounded as at the leading edge. A cross section of the wing, shown in the plan, article 12, will give you a good idea of the contour your wing should have.

After having sanded your wing to the proper form with coarse paper, use a medium or fine grade to smooth it off. The edge of the wing tips should be well rounded without any irregularities.

The third step in preparing the wing is to draw a line perpendicular to the leading and trailing edge at the exact center. Then carefully cut the wing in half along this line.

Operation four is to make the ribs. The pattern shown in article 12 should be used to make six of them; four are cut from balsa sheet 1/16" thick and these will be the outer ribs, and the two center ribs are cut from balsa 1/8" thick. Sand these over lightly and cement them in the proper places in the two wing halves. The thick ribs should be cemented at the square end of each wing sheet. When the wing is fully assembled these will be at the center of the wing. One thin rib should be cemented to the under side of the sheet 3¼" from the square end of each half wing and another 6-1/2" from this end.

The operation of cementing in the ribs should be done very carefully. First smear a little cement on the under side of the wing along the line where the rib will be attached. Then apply cement to the upper curve of the rib, pressing the rib up against the under surface of the wing at the proper place, holding it secure by means of pins piercing the leading and trailing edges of the wing sheet. In holding the wing sheet to the ribs in this manner the pins should be inserted at an angle of about forty-five degrees with the leading edge of the rib; two pins in the front and one in the rear should be sufficient. One in the middle, also, will help. Each rib should be held in place in this manner.

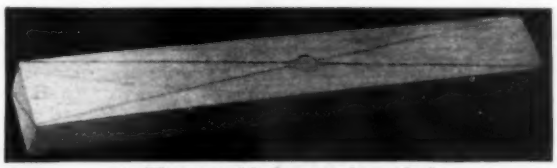
When these operations have been completed set the half-wings aside so that they rest on an even surface, while the cement is drying. If they are carelessly tossed aside or put in some position in which there is more pressure on one edge than on another the whole wing sheet is liable to dry in a warped shape. If this occurs your wing will be useless, for your plane will never fly in a proper manner.

Operation four is cut the tail surfaces. First draw the outline of the stabilizer on your balsa sheet and with a sharp penknife or razor blade cut out to the proper outline. When cutting the curved ends of the stabilizer or of any surface, draw your knife *with* the grain and never *against* it. Unless this is done you are liable to split the balsa irreparably.

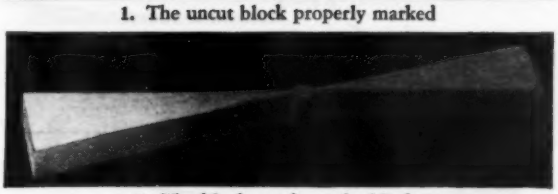
Both the stabilizer and fin should be cut from 3/64" or 1/32" balsa; the stabilizer being 9-1/2" long and 2-1/2" wide and the fin 3-1/2" high and 2-1/2" wide. When this is done sand both sides of these surfaces lightly, rounding the edges so there are no irregularities.

Operation five is cutting the motor stick from hard balsa. This should be made 17-5/8" long, 5/16" deep and 3/16" wide. At the front end the stick should

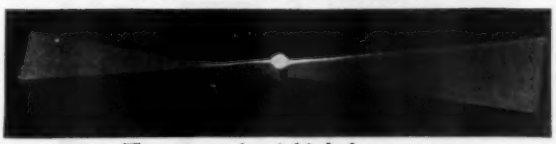
(Continued on page 69)



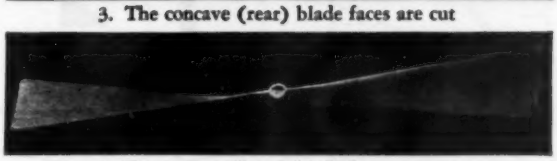
1. The uncut block properly marked



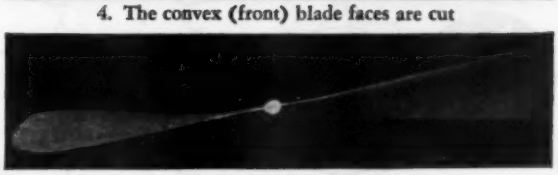
2. The blank cut from the block



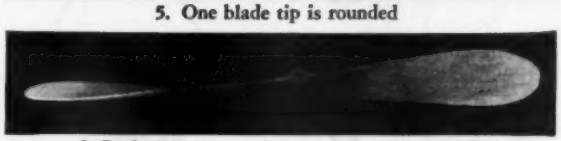
3. The concave (rear) blade faces are cut



4. The convex (front) blade faces are cut



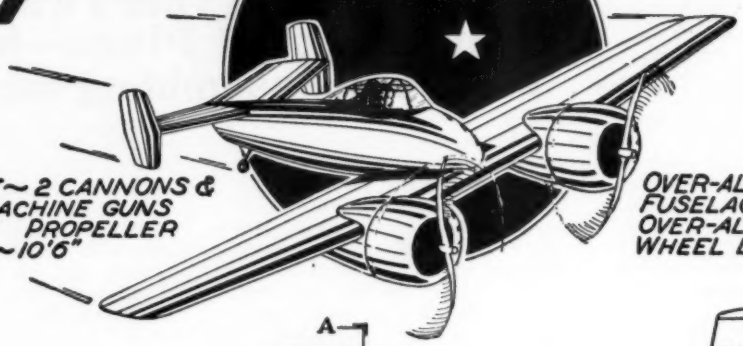
5. One blade tip is rounded



6. Both tips are rounded, sanded and balanced

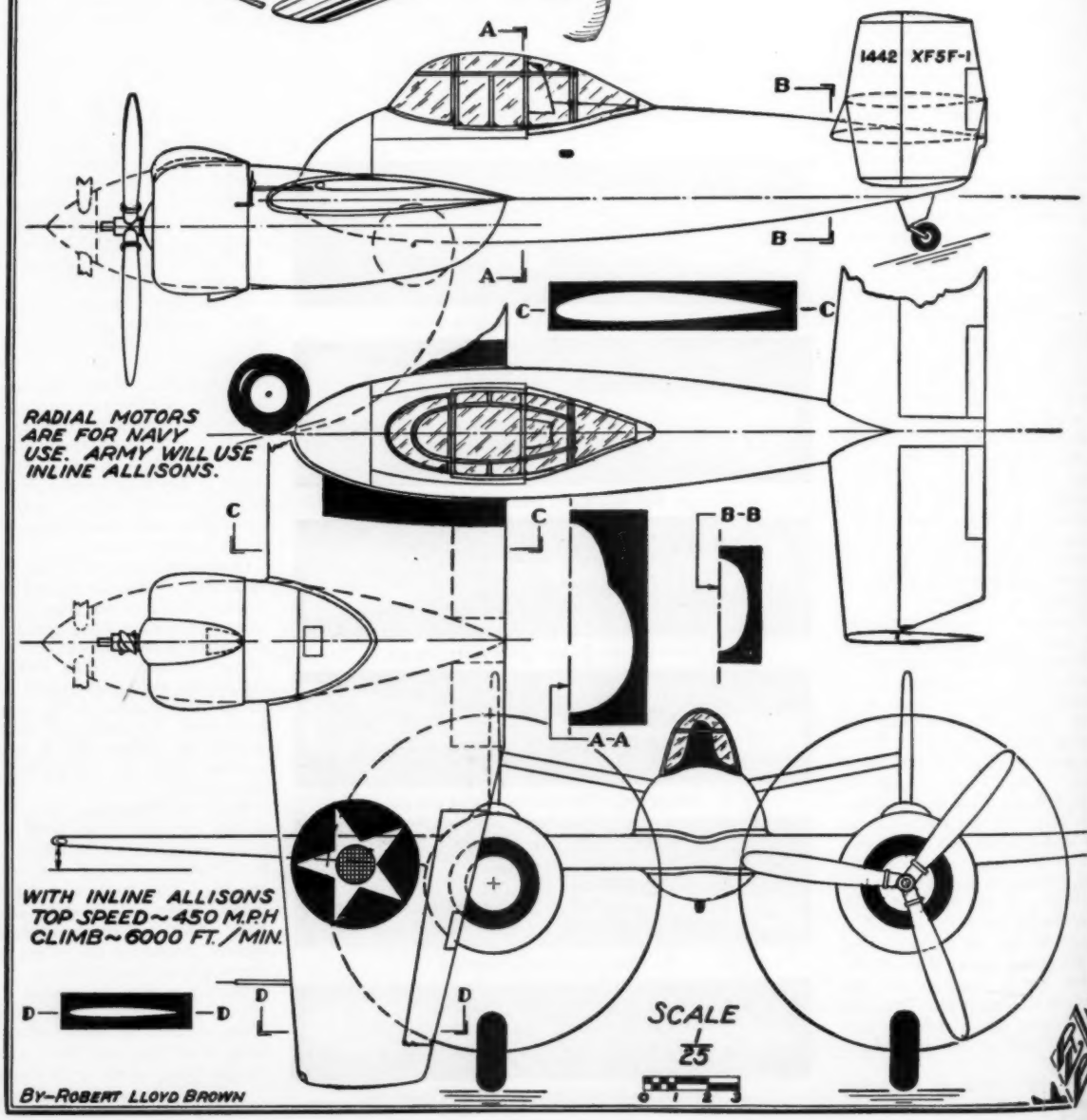
Copyright 1940 By Charles Hampson Grant

FASTEST 'Pursuit' By GRUMMAN



ARMAMENT ~ 2 CANNONS & 4 HEAVY MACHINE GUNS
SPAN ~ 41' PROPELLER DIAMETER ~ 10'6"

OVER-ALL LENGTH ~ 28'
FUSELAGE LENGTH ~ 22'
OVER-ALL HEIGHT ~ 10'
WHEEL DIAMETER ~ 2'



BY—ROBERT LLOYD BROWN

Skyrocket With Wings

THE PLANE ON THE COVER

ROBERT McLARREN

The phenomenal, new 2400 hp. Grumman navy pursuit plane. It has a high speed of 450 m.p.h. and climbs straight up; equipped with 2 cannons and 4 machine guns

THE degree of efficiency, certainty and strength of our national defense is largely a matter of the equipment comprising each branch of the service. Our army and navy air forces consist essentially of the airplanes they fly and thus we see that only through the closest kind of cooperation between the service and the manufacturers can any amount of progress be made. The manufacturers have the skill and knowledge to build a safe, efficient airplane from a structural point of view; the service, the skill and knowledge to lay down specific tactical requirements of these airplanes.

Often both the army and navy combine in the development of a single type of airplane such as in the case of the Boeing pursuit ships, the North American trainers and the old Loening amphibians. But the most modern example of the complete concentration of effort of both the army and navy air services on the design of a fighting airplane is the Grumman "Skyrocket," our Plane on the Cover this month.

Contrary to popular belief, this ship was not wholly a navy design. The ship was originally drawn up in patent form and a War Department patent number issued in the Spring of 1939. The design at that time had only one rudder and a more streamlined type of cockpit enclosure. The navy displayed a great deal of interest in the design and further modified and re-designed it to include more powerful motors, a double tail and a thinner high-speed wing section. After the completion of preliminary design, bids were asked from a trio of manufacturers, with the result that Grumman won the honor of constructing the prototype ship.

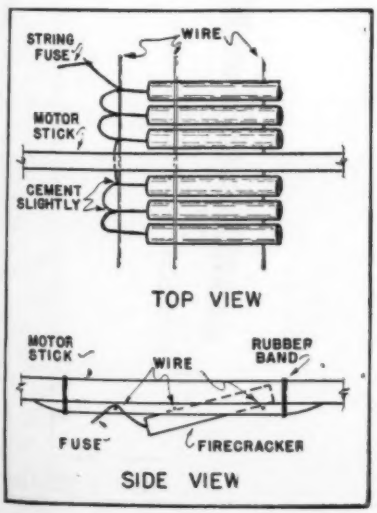
Although the army version has not as yet appeared, the navy ship is known as the XF5F-1. In over a dozen different ways it is like no other single ship ever constructed. It consists essentially of a single monoplane wing mounting two giant engines. To this is attached the fuselage beginning just aft of the front spar of the wing in such a manner that the entire leading edge of the wing presents an uninterrupted flow of air. The wing is built up of extruded section riveted ribs attached to two spars which run parallel the complete span of the wing. The motor mounts are of welded chrome-molybdenum steel tubing attached to the main front spar. The wing tips are of the "square" type for ease of manufacture. The ailerons are fabric covered and are statically and dynamically balanced through the use of two lead weights bolted into the leading edge of each panel. The flaps are mechanically operated and are of all-metal sheet-covered construction. They run the complete under surface of the wing trailing edge between the ailerons.

The fuselage is of conventional frame, longerons and riveted skin construction and is bolted to the wing at four points using two bolts at each point on the front and rear spars. The nose of the fuselage is rounded and flush riveting has been used throughout the skin attachment. The pilot sits high in the fuselage and is protected by a solid cantilever over-turn structure which also serves as a headrest. The sliding section of the cockpit enclosure is equipped with an emergency exit release latch. The entire cockpit enclosure is of moulded plastic acetate sheet providing maximum vision in all directions. The enclosure is of streamlined form and tapers down to the fuselage in the rear to form a semi-cupola contour.

The tail surfaces are of full cantilever construction throughout; the stabilizers being of ribs, spars, and sheet covering throughout. The horizontal stabilizer has a pronounced dihedral angle and supports the vertical stabilizers at its extremities. The elevators and rudders are of extruded section ribs and trailing edge all-metal construction fabric covered. They, too, have square tips for ease of manufacture.

The tail wheel is not retractable and is provided with a pneudraulic shock strut of long-travel design. The tail wheel is of the smooth contour type and is full swiveling with a locking device for take-off and landing. The navy regulation

(Continued on page 57)

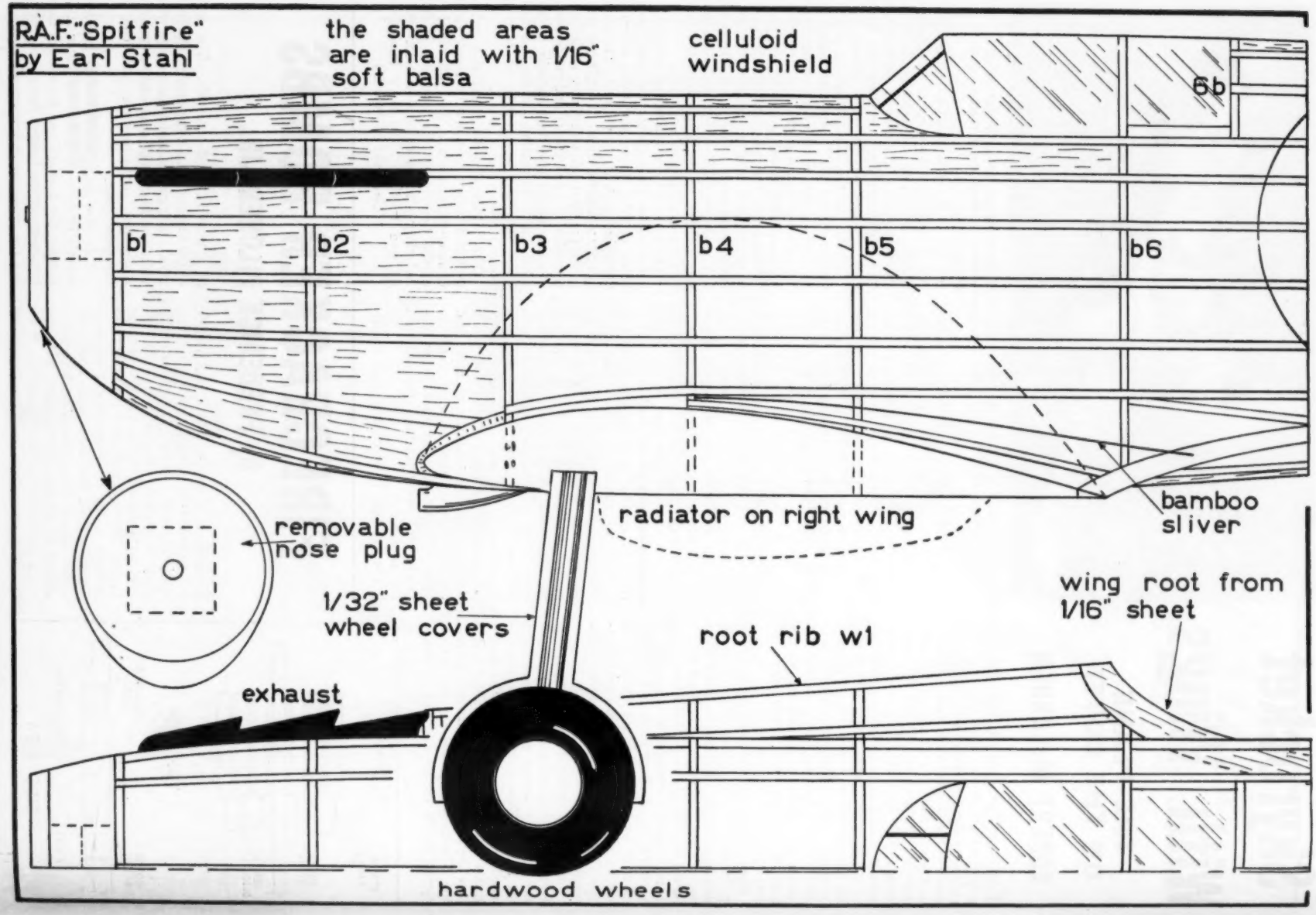


FIRECRACKER BOMBS

By FREDERICK PILCHER, JR.,

HERE is a device which will enable you to drop bombs from your model plane with realistic effect. The illustration shows it applied to a stick model. It consists of a rider held in place by rubber bands. Through this rider is placed three straight wires in a horizontal position. These support the firecracker bombs on either side of the sticks. The firecracker should be mounted, as shown, with the fuses cemented together in series. With this arrangement the bombs will drop one at a time at equal intervals. The rear of the firecracker is supported by the rear wire. This passes under the middle wire while the fuses pass over and around the front wire, supporting the front end of the firecracker.

This also may be applied to fuselage models by cementing a boom motor stick beneath the fuselage and far enough from it to prevent the lighted fuses from burning the covering or framework.


R.A.F. "Spitfire"
by Earl Stahl
the shaded areas
are inlaid with 1/16"
soft balsa
celluloid
windshield
6b
b1
b2
b3
b4
b5
b6
removable
nose plug
radiator on right wing
bamboo
sliver
1/32" sheet
wheel covers
wing root from
1/16" sheet
root rib w1
exhaust
hardwood wheels

Realistic in appearance and powerful in flight

The SPITFIRE

FLYING MINIATURE

Build and Fly This High-Performance Exact Scale Model of One of Britain's Most Deadly Fighters

By EARL STAHL

THE geographic location of England makes it most vulnerable to attacks from the air, and as a means of defense the interceptor-fighter planes have been developed. These venomous single-seaters operate at close range and it is their military duty to sweep raiding aircraft from the sky. Such planes as the famous Hawker "Hurricane" and the "Spitfire" are designed to rocket skyward at an astonishing rate, be fleet enough to overtake the swiftest invader, possess a great degree of maneuverability and finally be deadly enough to promptly dispose of the luckless victim.

The Vickers-Supermarine "Spitfire" is not a new design; the first of this type being tested in 1936. Production difficulties plagued volume construction, however, and it was only recently that complete squadrons of "Spitfires" were in service. Of all-metal construction, this aerial terror is not only one of the world's best performers but it is also one of the most attractive. A liquid cooled Rolls-Royce engine of 1030 horsepower pulls it along at a maximum speed of 367 miles per hour—its diving velocity exceeds even that of the famous Curtiss 75-A for it is said that a "Spitfire" attained a speed of nearly 700 miles per hour in a similar plunge. Eight Browning machine guns jut from the wing's leading edge making it one of the heaviest armed single-seaters. Squadrons of these fiery fighters are constantly in readiness to intercept Nazi trespassers.

The model retains the attractive appearance and streamlines of the original and an effort has been made to simplify the manner of construction as much as possible while still retaining the desired features. The satisfaction it is sure to afford, whether on display or in flight, will more than compensate for the time and effort expended on its construction. After becoming familiar with the plans and the procedure of construction, you may start to build the—

Fuselage

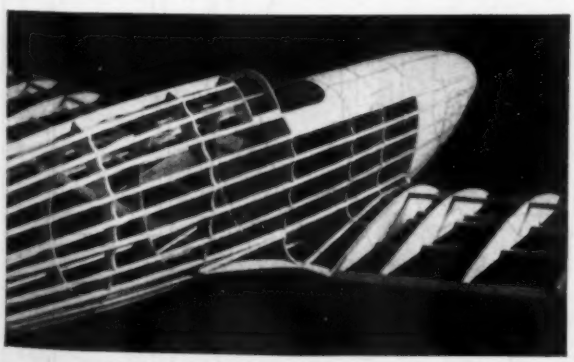
The fuselage is constructed about a top and bottom keel. To obtain the shape of the keel pieces it will be necessary to trace the top and bottom outlines of the side view. A depth of 3/16" will be about right and the keels should be cut from 1/16" sheet balsa. The bulkheads are cut from 1/16" sheet also; two of each type are needed. Cut only the notches shown;—the purpose of this is to aid in properly aligning the stringers. Enough of the bulkheads have notches cut in them to insure proper spacing of the stringers and it will be a simple matter to cut the remaining ones as needed. Pin the keel pieces into position over the side view and cement half of the bulkheads to place. Remove from the plan and add the remaining formers. Next the 1/16" square middle stringers are added to each side. Exercise caution to avoid pulling the fuselage out of line. Once a stringer is secured to one side of the structure always attach

(Continued on page 38)

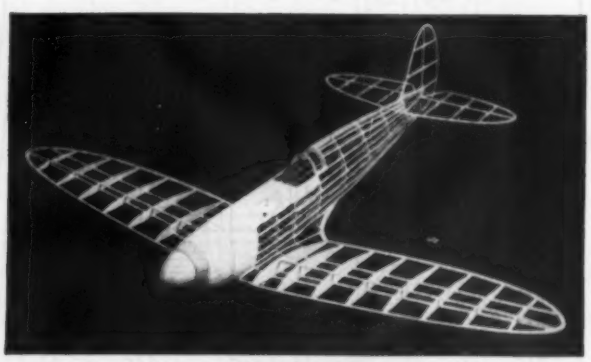
A fine stable flier

Careful decoration improves appearance

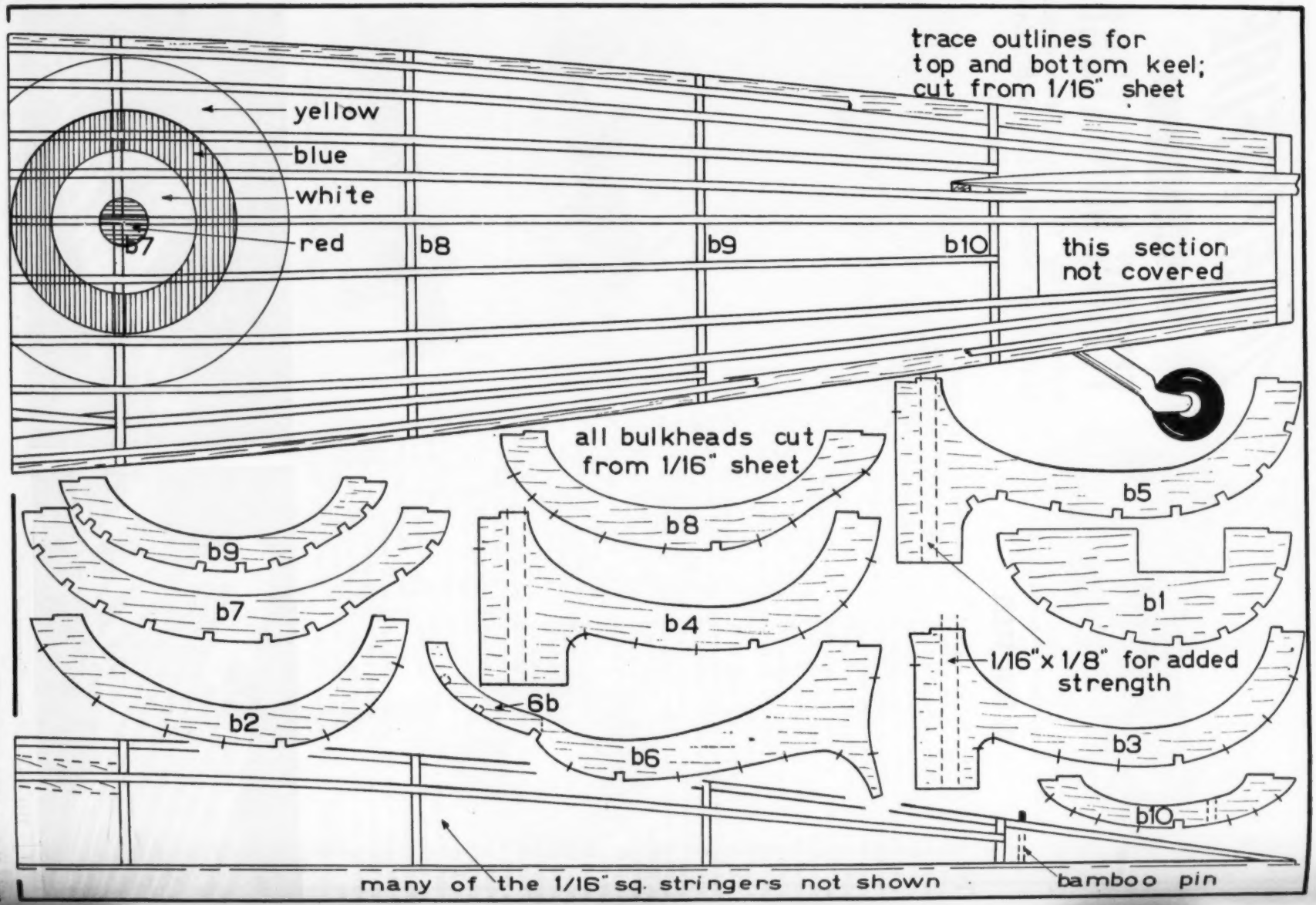
The large propeller gives long flights



This close-up shows refinement of detail



It is carefully designed and strong


trace outlines for
top and bottom keel;
cut from 1/16" sheet
yellow
blue
white
red
b7
b8
b9
b10
this section
not covered
all bulkheads cut
from 1/16" sheet
b5
b9
b8
b1
b7
b4
1/16"x 1/8" for added
strength
6b
b2
b6
b3
b10
many of the 1/16" sq. stringers not shown
bamboo pin

Complete WITH MOTOR

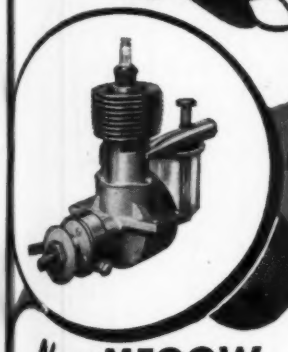
14.95

MOTOR, WHEELS, PROPELLER, FLIGHT TIMER AND KIT

95c

AIRPLANE KIT ONLY
Less Wheels and Propeller

RITE-PITCH PROPELLER



MEGOW'S *New Gas-Powered* AeroChamp

and the New Megow "199" MOTOR

Now! A gas model airplane COMPLETE WITH MOTOR . . . and *what* a motor . . . Megow's new "199"!

Heretofore airplane models have not been designed for any particular motor, nor motors for any particular models, and performance has depended on the individual builder's ability to make the two fit and work together efficiently. Now you can have both, designed to go together.

This sensational AERO CHAMP is a brand new type of model airplane, practical in design and easy to build. With a wingspan of 46 inches and flying weight of sixteen ounces, it is small, light and sturdy for safe landings. Megow sponge wheels, "Rite-Pitch" propeller and Flight Timer all included with motor, plans and necessary materials for $14.95. Airplane kit only, less motor, wheels and propeller, 95c. Motor only, $12.50. See them at your dealer's, or write direct to us.

New MEGOW "199" MOTOR $12.50

(WITH COIL AND CONDENSER)

Bore and Stroke, ⅛". H.P. 1/7.
R.P.M. Max. 10,000. Disp. .199.
Weight, 3½ ounces. Block tested.

CYLINDER. Turned from solid chrome Vanadium steel, honed and lapped to .0001". Cadmium plated.

PISTON. Machined and precision-ground from special centrifugal cast iron.

TIMER. Fully enclosed, with special fulcrum type arm and auxiliary spring. Points finest ground and polished tungsten.

CRANKCASE. Special aluminum alloy. Permanently sealed. Extra long special high-speed bronze bearing.

• Motor operated equally well upright or inverted. Visible type gas tank. Oversize fins for efficient cooling. Most efficient coil and condenser obtainable.

SEND 5¢ FOR CATALOG OF MODEL AIRPLANES

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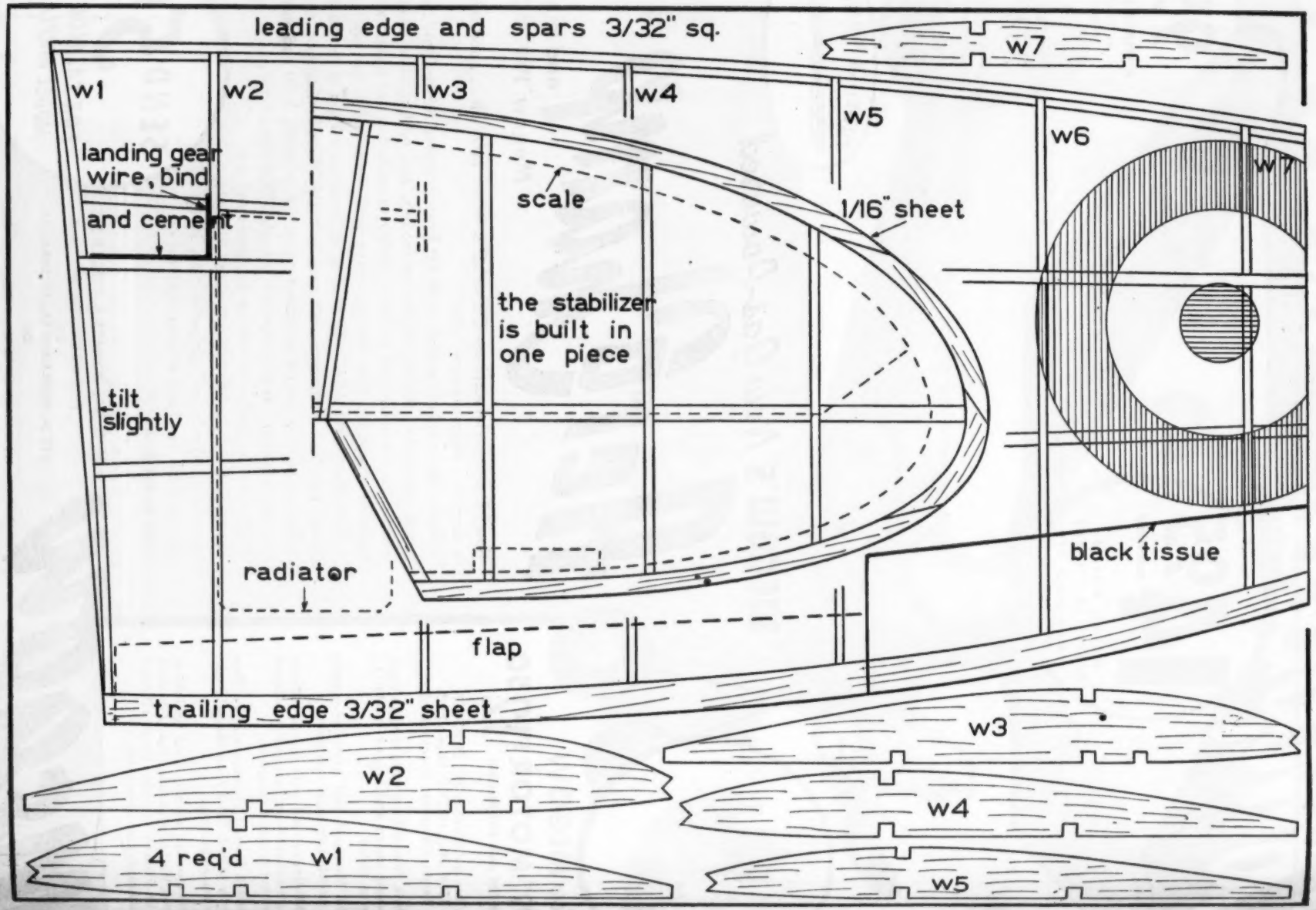
G. Saavedra, Mexico. R. E. Granger Travel, Ltd., 24 Notre Dame, Quest, Montreal, Canada.

many of the 1/16" sq. stringers not shown . bamboo pin

1940


leading edge and spars 3/32" sq.
w1
w2
w3
w4
w5
w6
w7
landing gear wire, bind and cement
scale
1/16" sheet
the stabilizer is built in one piece
tilt slightly
radiator
flap
black tissue
trailing edge 3/32" sheet
w3
w2
w4
4 req'd w1
w5

And Now They Come!

1940 OHLSSON

VICTORIES COAST-TO-COAST!

The WINNERS' *Circle*

NATIONAL CHAMPION TAKES ANOTHER—Dick Everett, National Class C Champion, took first place May 18 at Hadley Field, Brooklyn, with an Ohlsson 19. Dick writes: "All I can say for my '19' is to praise it. The motor has the stuff and really yanks my crate upstairs. The climb is vertical and I've never had *any* trouble starting or running it."

OHIO MODELER WINS—Gayle Paxson, Salem, Ohio, writes: ". . . At the N. A. A. Meet at Butler, Penn., April 28, I won first place with a three-flight average time of six minutes, fifty seconds. My plane was a Class B, Ohlsson 23 powered ship. *As first prize I won an Ohlsson 19.*"

FIRST IN NEW JERSEY

Eugene Orlando, Garfield, New Jersey:—"My Comet Zipper powered with an Ohlsson 23 won *first place* in Class B and *first place* for Best Flight of the day."

"60 CUSTOM" VICTORY

Mr. Louis Herback, Herback & Rademan, Inc., Philadelphia: " . . . Congratulations on your new Ohlsson 60. Our Mr. Leshner won first place with your motor on April 28th in South Jersey Gas Model Assoc. Meet . . . "

OHLSSON "19" VICTORY

Roy Noemura, Troutdale, Oregon: "... May 5 at Yakima, out of a field of over *100 planes*, my Ohlsson 19 plane took First Place Class A. Using your 23 in same ship I took third place in Class B . . "

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THE WINNERS' CIRCLE

with an Ohlsson!

Class A, B, or C—you, too, can be up with the winners with Ohlsson performance. By the time this advertisement appears other Ohlsson owners will have set new records in meets across the country. Ohlsson engineering is *winning engineering* in each class! See the 1940 Ohlssons at your dealer's and *write today for complete literature.*

OHLSSON 60

Custom

Ohlsson 60 Custom—climbing performance Class C of a type form ly associated only w Class B Models! The f est-built engine on a field! Available for inve ed or upright operati at no extra cost.

$21.50

MODEL AUTHORITY PRAISES

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Elbert J. Weathers, Los Angeles, nationally known Model authority and designer of famous "Mystery Man" and "Western" models which he is now powering with Ohlsson 60 Custom motors reports: "The writer would like to express his keen enthusiasm for the new Ohlsson 60 Custom. The power output even with a 15 to 16 inch prop of mean pitch is amazing, notwithstanding the easy starting and non-sensitive needle valve operation."

LAST MINUTE FLASH

OHLSSONS!

California Championship Southern California Gas Model Contest June 9th—Ted Gillett's Comet Zipper powered with Ohlsson Sixty Custom climbs to 1500 feet in sixteen seconds and soars 28 minutes 31 seconds for first place Class C. Bob Malone takes first place Class B using Ohlsson 23, again proving the Champion is still champion in the field and up to and including 30 cubic inches displacement.

WHY OHLSSON DOESN'T BUILD *Cheap* MOTORS

Winning motor performance depends on advance designing followed up by quality materials and quality workmanship. For this reason, Ohlsson engines have never been built to a price—*but to a standard.* This standard is the highest type of miniature gasoline engines it is possible to build—for the progress of the model sport and satisfaction of model builders the world over. Prizes of all 3 Ohlsson motors are based on Ohlsson's greater facilities plus volume production—made possible by the thousands of fans to whom Ohlsson quality means true economy and *winning performance.*

OHLSSON 19—built to the limit for Class A—.199 cu. in. Handles Class B ships in Class A competition, quickly interchangeable with Ohlsson 23. Exceptional value at only **$14.50**

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OHLSSON 23

Ohlsson 23—the outstanding competitive motor and National Champion of Class B. Outperforms and outlasts any engine up to and including motors of .30 cu. in. displacement. Price, complete

$16.50

1/16" sheet
1/16" sq. plus 1/32" x 1/16" (both sides), sand streamline
scale
1/16" x 1/8"
propeller 1/2 scale
power: 10 or 12 strands 1/8" rubber
dihedral at tip 2-1/8"
rubber tube over axle
front view 1/2 scale
3/32" sheet
w8
w6
all ribs from 1/16" sheet
.040 wire landing gear

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Model Airplane Cement

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TUBE SHOWN ACTUAL SIZE

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World's Largest Manufacturers of Model Airplane Chemicals

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25 INCH WING NEW Flying De

SCIENTIFIC R.O.G.
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A sure contest w... All white with brown ... The twin rudders ... greater spiral stabil...

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FLEA GAS TYPE MODEL

"The Flea" Wingspan 36"—length 28"—weighs 3 oz. Kit contains everything: including M & M wheels, dummy gas engine ..... $1.95 PP

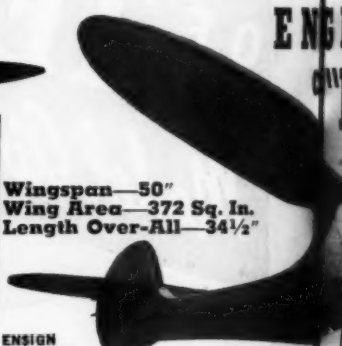
CLASS "C" MERCURY

Wingspan—6 Ft.
Wing Area—750 Sq. In.
Length Over-All—52"

MERCURY FEATURES:
Staggered tail surfaces, Tapered wings, and a front end that is really designed to stand all the shock of motor vibration and landing impact.

$4.95 P.P.

SCIEN... GAS M... CHAM...



Wingspan—50"
Wing Area—372 Sq. In.
Length Over-All—34½"

ENSIGN FEATURES:
Finished landing gear formed. Finished landing gear clamp, a new SCIENTIFIC feature. Movable battery box for weight balance adjustment. SCIENTIFICALLY constructed motor mount.

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Send 5¢
Contains many new low prices.

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EXHAUST MANIFOLD

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Special Prop. Spinner..... 15¢ P.P.

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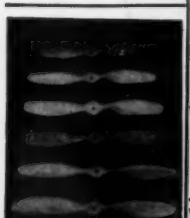

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9" 25¢	12" 25¢
10" 25¢	13" 25¢
11" 25¢	14" 25¢

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Prices Cut To $1.50 Postpaid

Accessory Kits for All Grinders
COMPLETE KIT 75¢

SCIENTIFIC STAR PROPS

9" 25¢
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WORLD'S FINEST QUALITY FINISHES

Clear Dope, Colored Dope, Thinner, Cement, Heavy Cement, Bamboo Cement, Banana Oil.

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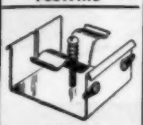

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Penlite size ¼ oz. .....20¢ P.P.
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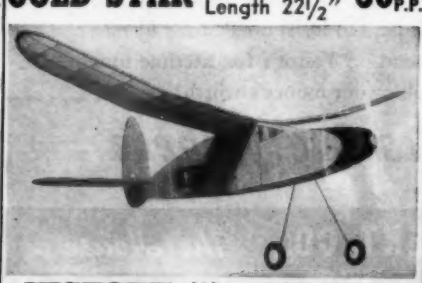

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"Valkyrie" Wingspan 24"; Length 15" Flies ½ Mile

Designed by Indoor Expert Carl Goldberg. Can be easily constructed in 4 or 5 hours. Sturdily built with all latest features. 50¢ pp

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SEE YOUR DEAL...
SCIENTIFIC MO... AI...
"GAS MODEL QU...
218-220 MA-8 MAR...

...N'T SK FOR BETTER MODEL AIRPLANES

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RAVEN

Diamond shaped fuselage. Designed for simple construction and contest winning flights. Fuselage and rudder light blue, yellow wings and stabilizer.

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Easy to build and a real flyer too. Has red fuselage and rudder. Wing and stabilizer light blue with red trim.

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SPEEDSTER

Here's a steady performer. Parasol wing type, with open cockpit. Red wing and tail surfaces, fuselage white with red trim.

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...contest wi... with brown... rudders ... ...piral stabili...

...CIENC... ...AS M... ...HAM'S

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...as Ty... ...MODEL... ...EY LO... ...L Y A... ...UND L... ...S MOD...

STARLING CLASS "A"

Wingspan—40"
Wing Area—210 Sq. In.
Length Over-All—27¼"

STARLING FEATURES: All balsa ready-die cut ribs and bulkhead, all balsa fuselage, motor hookup and landing gear are attached as one unit with a movable battery case for balance adjustment.

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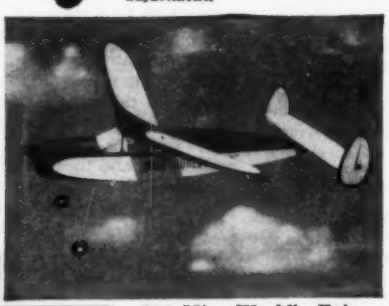

NEW 25c MISS WORLD'S FAIR

24" Wingspan

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Easy to construct, and a real flyer too—Wings machine tapered, Wingspan 20-⅝ inches—length 18 inches.

Complete kit only..... **25c**

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30" wingspan; overall length 24". It conforms with the N.A.A. contest requirements.

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AIRSTREAM UNIT Same as Standard Airstream less coil and condenser, postpaid..... **3.85**

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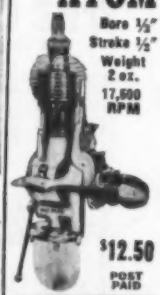

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Pneumatic with Bronze Bearings	3½" $1.10, 4" $1.25
Solid Rubber Wheels	$1.25

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Ohlsson

"23" Class B $16.50
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BROWNIE $7.50

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THE ONLY KIT OF TOOLS DESIGNED EXCLUSIVELY FOR THE MODEL BUILDER

Each blade scientifically shaped to do special work, *not merely straight line cutters!* 7 easily sharpened, rust-resistant speedily changeable cutters: Angle, Tongue & Groove, Dovetail, Inlay, Webbing, Notching, Streamlining, Rounding, Ovaling, T-H-L-V. Hand ground & sharpened blades. Ideal for Balsa and similar surfaces. (Blades alone, 3 for 25c). COMPLETE SET: 7 Blades with KANTSLIP HOLDER. . . **50¢**

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NEW 2 OZ. SUPER-COIL WORKS ON 1½ v. PENLITE CELL

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Class "A" Gas Model

THE MODERNAIR CLOUD DRIFTER

Only model with special wing slots that gives a better glide and prevents ship from stalling and spinning. 40 inch wingspread and 36 inch overall. Easily detached wings. Easy to assemble. Kit contains all parts, liquids. SEE YOUR DEALER. Special..... **$1**

Add 10c for packing if ordered direct.

Sea Hawk Amphibian. Complete Kit (less motor), $4.95 p.p.

MODERN MODEL AIRCRAFT SUPPLY CO.

597 Broad St., Central Falls, R. I.

The Spitfire Flying Miniature

(Continued from page 29)

one to the corresponding position of the other side. Check continually to assure a properly aligned structure.

The nose of the original model was "filled-in" with 1/16" soft sheet balsa. This is not a difficult job but it does require time and patience. Cut individual pieces of balsa so they will fit snugly into each open space between the stringers and bulkheads. When dry the whole nose is thoroughly sandpapered to a smooth, pleasing shape. Cut the nose block from a 1/2" thick block and cement it to place. It is advisable to lightly cement the 1/8" nose plug fast, too, so the entire nose can be shaped attractively.

Cement a "w-1" rib to each side of the wing root, being careful to make the angle of incidence identical to that of the plans. The trailing edge of the wing root, cut from 1/16" sheet, is trimmed to the correct size and glued to place. Brace the root bulkheads with pieces of 1/16" x 1/8" hard balsa as indicated by the dotted lines on the bulkhead patterns. 3/32" square pieces are fitted between the root rib and the fuselage to form the leading edge. A 1/8" thick false rib is fitted against the fuselage by the "cut and try" method—it extends from the leading edge to bulkhead number b-3. Several lengths of thin bamboo may be attached to the bulkheads to help round out the wing root.

Prepare the fuselage for covering by thoroughly sanding the whole structure. For the best covering job only those members of the fuselage which run from nose to tail should touch the paper, so use a piece of sandpaper wrapped about a pencil or similar round object to scallop the bulkheads.

Wing

Since the wing is elliptical in plan-form, all of the ribs in each half are different. Select a sheet of soft grade balsa for all of the ribs except "w-1" and "w-2" which require a stronger variety. Cut the required number of ribs and sandpaper them smooth. Notches must be cut with accuracy to insure a neat job when completed. The wing's trailing edge is cut from 3/32" sheet; the tips likewise. Select hard 3/32" square spars since they must resist the shock of landings. Assemble the parts directly over the plans and cement the joints firmly. When dry, the halves are removed from their jigs, trimmed and sandpapered to their final shape.

Tail Surfaces

The Spitfire's tail surfaces haven't sufficient area to insure stable model flights so we have enlarged them to more suitable proportions. Build the stabilizer in one piece for greater strength. Outlines of the stabilizer and rudder are cut from 1/16" sheet; ribs are 1/16" square. Additional strips are cemented to both sides of the ribs and when dry they are cut to a streamline shape.

Propeller

In all probability your Spitfire will need some extra weight in the nose to help balance the long tail moment arm, so we advise the use of a white pine propeller. A hardwood prop, while a bit more difficult to carve, will take more abuse. Lay out the blank, as indicated, on a block 9" x 1 1/2" x 1". Cut the blank to shape with a jig saw, etc. and then carve a right hand propeller. Finish the back face of the blades first and then reduce the front face to the proper thickness. Shape the blades so they resemble the wood props used on early Spitfires. (Latest models of this fighter are equipped with three-blade constant-speed metal-propellers.) The huge spinner will easily hide a free-wheel device which should be used to improve the model's glide. Make the spinner from hard balsa and fit it neatly to the prop hub. The application of several coats of clear dope with light sanding between each will prepare the prop for a smooth finish.

Remove the nose plug and cement a block 1/4" x 5/8" x 5/8" to the back so it will fit neatly into the hole in the nose. Drill a hole through the plug and cement washers to both sides so the prop shaft will revolve smoothly. Bend the propeller shaft from .040 wire; several washers will be needed between the prop and nose plug.

Covering

Cover the whole model with colored tissue to help keep the weight at a minimum. The model pictured is all red but the planes at war are camouflaged with dull green and brown paint. Cover the fuselage first, using banana oil to fasten the tissue. Numerous small pieces must be used to prevent wrinkles. Trim the surplus paper with a sharp razor blade and then carefully over-lap the next piece. It is not necessary to attach the paper to all of frame—just apply adhesive to the outsides of the area being covered. Cover the top of the wing with several pieces, if necessary, to avoid wrinkles. The under-surface of the wing is covered from the third rib to the tip, only, since the landing gear must be attached to the spars once the model is assembled. Spray a fine mist of water on the covered parts to tighten the tissue; pin the wings and tail surfaces to a flat surface to keep them from warping. Do not dope the covering until the parts are assembled.

Block the fuselage into a level position so the model can be assembled accurately. Attach the wings first; do not spare the cement for the wings are subject to the force of landings. Check to ascertain that the incidence of each wing panel is the same. The tips should be raised 2 1/8" for the correct dihedral. To attach the stabilizer it will be necessary to cut the tail-post and bulkhead

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90c Pair P.P. SIZE 2¾" **$1.50** Pair P.P. SIZE 3¼"

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All M & M Wheels can be inflated & deflated

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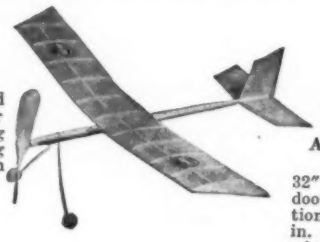
A stick model of advanced design with 24" cantilever type wing. A special fitting allows adjustment of wing for proper balance. A smooth flyer.

25c at your dealer's mailing charge 10c



PROJECT No. 5
ADVANCED OUTDOOR FUSELAGE MODEL

32" model qualified for outdoor contests. Meets national rules. Over 100 sq. in. wing area. Detachable wing and empennage. A flying champion.

50c at your dealer's mailing charge 15c

PROJECT No. 4
ELEMENTARY FUSELAGE

MODEL A simple cabin type model with 24" wing span, in appearance resembling outline of a full scale plane. Over 60 sq. in. of wing area. Cambered ribs. Detachable wing.

25c at your dealer's mailing charge 10c

OTHER FAMOUS GUILLOW PRODUCTS

Shelf and Flying Model Construction Sets. Ready-to-Fly Balsa Gliders. Airplane Kites. Selected Balsa. Airplane Cement.

"CLASS A" GAS MODEL CONSTRUCTION SET

36" wing spread; 23¾" overall length; 171 sq. in. wing area. Total weight (with Atom motor) 10 oz. **50c** less liquids and motor unit.

PROJECTS 1 AND 2

No. 1 16" glider with splendid soaring qualities. Hand or tow launched.

No. 2 12" lightweight R.O.G. model, with adjustable wing and landing gear.

10c each at your dealer's

PAUL K. GUILLOW WAKEFIELD, MASS.

number 10 in order that they can be sprung apart far enough to admit the stab. Cement the rudder on and check for correct alignment. The landing gear struts should be bent to shape and attached; the plan shows how the .040 music wire is formed so as to join the spars and second rib of each wing. Draw a front and side lay-out to aid in bending the wire accurately and be sure to make a right and left strut. Use strong silk thread and neatly bind the struts to the spars. Once the alignment is satisfactory, apply several coats of cement over all the buildings as well as the adjacent spars and ribs. The remaining uncovered parts should now be covered.

Complete the construction by adding the various details. The cockpit enclosure is thin celluloid; paper patterns should be shaped correctly before the celluloid pieces are cut. Rubber tubing of the correct size makes excellent covers for the landing struts, but if it is not available, bond paper should be wrapped into tubes of the correct size. One or two coats of clear dope are brushed on the covering; do this in a dry room to avoid "blushing." Check continually to prevent warping of the flying surfaces. Thin strips of black tissue should be doped to the covering to represent the control surfaces. The insignia used on the original model was made from colored tissue, too. Exhausts, tail wheel, wheel well covers, a radio antenna and numerous other details should be added to enhance the appearance of your miniature.

Flying

Ten or twelve strands of 1/8" brown rubber should be used to power this model. To many this amount of power may seem excessive, but the resulting zip and climb makes the model just that much more realistic. Lubricate the rubber and then remove the excess so the sides of the body will not be splashed. Attach one end of the motor to the prop shaft and with the aid of a weighted string drop the other end through the fuselage. A 1/16" round bamboo pin holds the motor in the rear. Your replica of this famous fighter is now ready for its test hop.

Select a grass-covered field and a calm day for the test flights. Balance the model by the wing tips—it should rest with the nose pointing down at a shallow angle. If any weight must be added, it will probably be needed in the nose. Try a few shoulder-height glides; it may be necessary to shift the center of gravity a bit to obtain the desired results. Wind the rubber motor about 50 turns and launch. It should climb a few feet and then glide smoothly to earth. Warp the stabilizer, if necessary, to correct any undesirable attitudes. Should the model bank excessively, "wash-in" the wing tip which is on the inside of the turn. Gradually increase the number of turns once the adjustments seem satisfactory. Stretch the rubber and use a mechanical winder for best flights. Exercise your best judgment in the construction and flying of your Spitfire and you will be rewarded with an attractive, fine performing model.

See a Complete and Vivid Account of the Nationals in the Next Issue

THANKS A MILLION!!

To you, our patrons, who have so nobly given us a chance to fill your orders in our time of stress. Rebuilding as a result of fire and shipping your orders too, tends to make for slow deliveries and we wish to take this opportunity to thank you for your patience and patronage.

We are now able to ship orders from the following "ad" within 48 hours.

BALSA WOOD
36" Lengths Per 100
1/32x1/16 ....10c
1/16x1/16 ....10c
1/16x1/8 ....20c
1/16x3/16 ....25c
1/16x1/4 ....27c
3/32x3/32 ....25c
1/8x1/8 ....30c
1/8x3/16 ....50c
1/4x1/4 ....55c
1/4x3/8 ....65c
3/16x3/16 ....50c
3/16x1/4 ....60c
1/4x1/4 ....85c

BALSA SHEETS
36" Lengths
1/64x2, 10 for 20c
1/32x2, 10 for 15c
1/16x2, 10 for 18c
3/32x2, 10 for 21c
1/8x2, 10 for 23c
3/16x2, 10 for 32c
1/4x2, 10 for 42c
1/2x2, 10 for 75c
If 3" widths are desired, double price of 2" widths

BALSA PLANKS
36" Lengths
1x1, each.... 6c
1x1½, each.... 9c
1x2, each.... 15c
1x3, each.... 20c
1x6, each.... 35c
1½x1½, each. 25c
2x2, each.... 25c
2x3, each.... 35c

CLEAR CEMENT
1 oz. bot. dz. 40c
2 oz. bot. dz. 65c
1 pt. 40c 1 qt. 65c
1 gal.....1.75

CLEAR DOPE
1 oz. .....doz. 36c
2 oz. .....doz. 60c
1 pt. 35c 1 qt. 60c
1 gal. each $1.50
Thinner & Banana Oil same price

COL'RED DOPE
All Colors
1 oz. bot. dz. 50c
2 oz. bot. dz. 75c
1 pt. 40c 1 qt. 70c

American Tissue
White, doz.....17c
Colored, doz. .20c

BEST BAMBOO
1/16x¾x15 dz. 8c
1/16sq.x12 gr. 10c

MACHINE CUT PROPS, per doz.
5"....20c 6"....21c
7"....30c 8"....35c
10"....45c 12"....60c

AIR WHEELS
(For rubber powered models)
per pr.
1¼"-1⅜"-1½"-1⅝"-1¾"-2"....38
1⅞"-2"-2¼"-2½"....40
2¾"-3"-3½"-3¾"....45

THR BEARING
sm. ea. 6c gr. .55
lg. ea. 7c gr. .65

PARA RUBBER
225 ft. skeins
¼ flat.....40c
3/16 flat.....65c
Per lb.....$1.20

WASHERS
⅛ or ¼, 100 8c

Shafts or Rear Hooks....doz. 6c

SHEET ALUM.
.002 thick, 5" 35c
.005 thick, 5" 50c
.010 thick, 5" 75c

ALUM. TUBING
1/16 O.D., 5" 25c
3/32 O.D., 5" 26c
⅛ O.D., 5" 30c
¼ O.D., 5" 43c

WIRE, per 100 ft. Straight Lengths
No. 6.....22c
No. 8.....27c
No. 12.....32c
No. 14.....37c

BRASS BUSHINGS
1/16 dia., 100 12c
3/32 dia., 100 18c
⅛ dia., 100 18c

SHEET CELLULOID
12½x16, ea. 19c
6x8, doz.....65c

SPRING STEEL WIRE
(In five (5) foot Length)
1/16 dia.....
.35 ft. for .25
3/32 dia.....
.25 ft. for .50
⅛ dia.....
25 ft. for .85

PNEUMATIC WHEELS
For Gas Models With Valves
3½" pair $1.30
3 pair for 3.30
4½" pair 1.50
3 pair for 3.90

WE CARRY A FULL LINE OF ALL MAKES MOTORS FOR IMMEDIATE DELIVERY.
Motor Trades Accepted.

NO ORDERS UNDER $2.50
Orders Shipped Express Charges Collect. On C.O.D. orders, send 25% with order, balance on delivery. Save C.O.D. charges, send payment with order.

NOTE NEW ADDRESS

DIAMOND MODEL M'F'G. CO.
915 Saratoga Ave. Dept. M-8 Brooklyn, N. Y.

FLASH-NEWS

SPECIAL TO MODEL AIRPLANE NEWS:

COMPLETE manufacturing rights to the sleek, fast Harlow monoplane trainer have been sold to Cub Aircraft Corporation, Ltd. of Canada. Production for the Royal Canadian Air Force will begin immediately and it is believed that the Harlow all-metal ship will provide primary, advanced and even fighting and bombing training in a single ship. A representative of the Kingdom of Iraq, British Protectorate, has also inspected the ship and a large order is pending. Two models are offered; two seater side-by-side, and two-seater tandem.

Two weeks after receiving an order for 509 one-hundred horsepower engines from the Canadian Government, the Kinner Motors Corporation announced shipment of the first batch of 15. The balance of the contract will be staggered over two years. The motors are to be used in Fleet trainers as well as DeHaviland models, it was announced. In addition, Kinner is now completing deliveries to China, Turkey, South America and the United States.

Headed by famed Bernt Balchen, a Scandinavian warplane purchasing mission has just placed orders with the Northrop Corporation for 24 light patrol bomber seaplanes and with the Douglas Company for 12 smaller attack landplanes. Total price mentioned was $2,500,000 but options in the amount of $5,000,000 will be exercised in the very near future. The Kingdom of Norway was the purchaser.

Bringing to a total of seven employed by the company, the Curtiss Aircraft Corporation has recently added Barton T. Hulse and Harold Bayley to their Buffalo test-pilot staff.

Ordered by South African Airways: 13 high-speed Lockheed "Lodestar" twin-engine transport and two "Excalibar" four-motored airline giants at a total cost of $2,100,000. Delivery of the Lodestars will begin early in October and the two Excalibars have been promised by late November or early December of next year.

A new "First" was the U. S. Air Corps' all-blind flight of a 22 1/2 ton Boeing B-17B four-motored bomber from Mitchel Field, Long Island to Langley Field, Virginia. Navigating the 300 miles in 2 hours and 2 minutes, Major Carl B. McDaniel became the first man in history to make a point-to-point flight while completely "under the hood."

First Bell "Aircuda" WFM-1 twin-engine pusher-fighter has been accepted by the U. S. Air Corps. Radically re-designed throughout, the new multi-gun fighter featuring two aero-cannons in nacelles in each wing, is much deeper through the fuselage, features a novel retractable landing gear and improved power, design and performance throughout.

Most sensational ship of recent years is Grumman's new XF5F-1 twin-engine navy fighter. No other military plane was designed and constructed in such secrecy and yet created such an international furor upon its debut. As radical as it is fast, the ship features a fuselage extended rearwards from the rear spar of the wing only, twin tails and two huge 1200 hp. Wright engines. The "Skyrocket," as it has been dubbed, has a wing-span of 42 feet and an over-all length of 28 feet. It is reputed to have a top speed of 425 miles per hour at 16,000 feet where its huge double-row radial engines develop their maximum power. The plane has been released for export and authoritative circles state France has been negotiating for orders.

The new Bell XFL-1 intercepter pursuit plane; a two wheel version of the Aerocobra for "carriers." It is powered with an Allison 1000 h.p. motor and has a spar of 35 ft

Ordered by the U. S. Air Corps: forty Boeing B-17D four-engined bombers at a cost of eight million dollars. Improved versions of the forty B-17C's ordered last fall, it has been stated that this quantity will be completed in 160 days.

Release of the air corps tightly guarded Allison liquid-cooled engine for export has resulted in immediate plans for double plant expansion and the stepping up of production on foreign orders received in the past month. These engines will be used to power Curtiss and Lockheed fighting planes ordered by the Allies.

Latest Douglas is the El Segundo Division's experimental scout-bomber, the XSBD-1. A development of the BT-2 navy bomber, the new ship features a simplified retractable landing gear, revamped cockpit enclosure and wing panels and redesigned tail surfaces. With orders already on hand from the navy, the first prototype machine has been tested. It has been designed to carry a single one-thousand pound bomb, plus adequate machine guns and navy scouting apparatus.

First Douglas R3D-1 navy transport has been accepted at North Island Naval Air Station. A development of the famed DC-5 tricycle airliner, the navy model features more powerful motors, completely redesigned interior and fixed equipment and dihedral horizontal stabilizers. This latter feature has also been incorporated into the production models going to K.L.M. in Holland.

The Douglas DB-7 promises to be the most successful light bomber as yet designed. Orders now on hand, in addition to the 100 already shipped to France, include an additional 200 for France, 750 for England and 176 improved and more powerful versions known as the A-20 and A-20 models for the United States Army Air Corps.

Latest scout-bomber delivered to the navy is the Vought-Sikorsky SB2U-3, a modification of the well-known SB2U-1 navy dive bomber. This latest version is a seaplane equipped with a new-type Edo twin-float gear. Various minor refinements include a larger engine and reshaped cowling and different outer wing panels.

United Airlines has doubled its purchases of Douglas DC-4 quadri-motored tricycle transports which brings to a total of 20 the number of ships they have ordered. Now under construction, the first ship has been promised by the fall of next year.

At an impressive ceremony, Captain J. W. Reeges was placed in command of the U.S.S. Wasp, the navy's newest aircraft carrier, at his commission at the Boston Army Base. The ceremony was witnessed and participated in by the one thousand members of the ship's crew, all of whom were transferred to the new vessel at their own request.

Daily reports on just how our warplanes are doing in Europe have been received by the air corps high command. Considered the greatest possible testing ground, Maj. Gen. H. H. Arnold states that the action of our planes in the conflict has already taught our Air Corps seven lessons: (1) Leak-proof fuel tanks are sorely needed in modern fighting ships. (2) Military aircraft require armor-plating around their vital parts. (3) Present armament of fight-

(Continued on page 44)

DENNYMITE

Announces

6 GREAT IMPROVEMENTS

★

CYLINDER AND PISTON made of newest development in cast alloy iron. Gives longer life. ★

CYLINDER WALL increased in thickness to give greater strength. ★

CRANKCASE AND TIMER ARM, made of new grain-controlled cast aluminum alloy, developed for use in large aircraft. Meets Army and Navy specifications. Practically impossible to break.

★

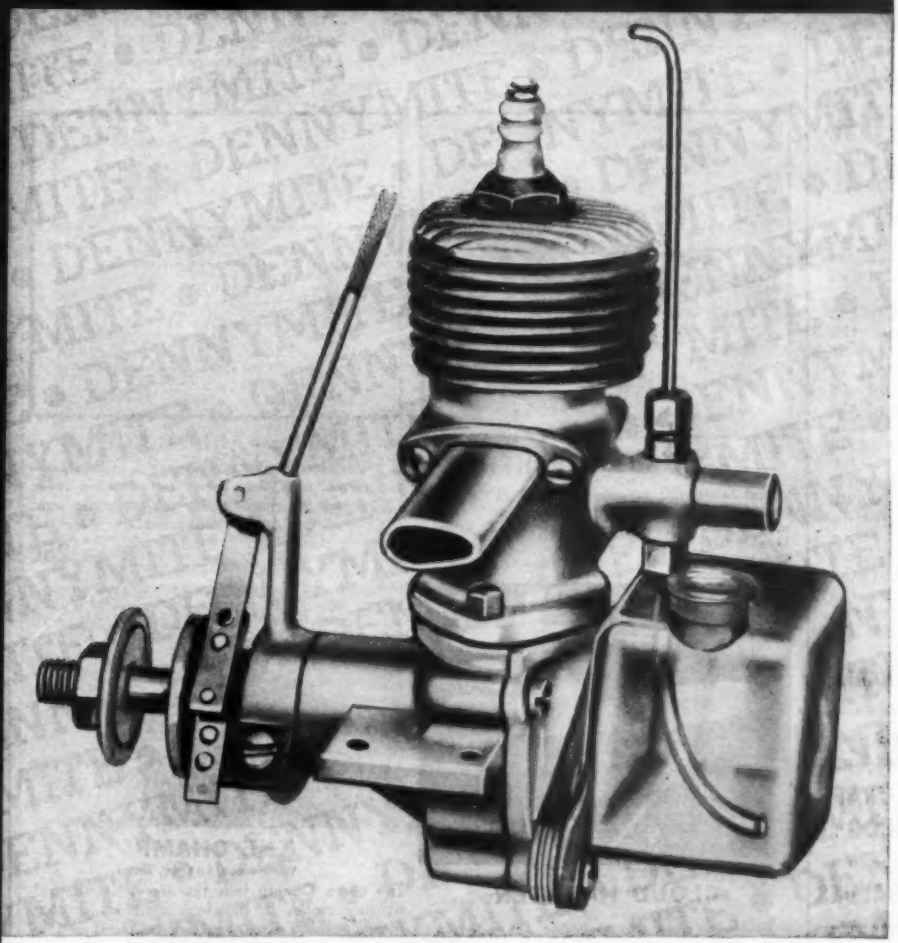
ALL ALUMINUM PARTS now made in permanent molds, have appearance and good looks of die casting, and even greater strength than either sand or die casting.

★

GAS TANK of new, transparent Tenite moulded plastic, mounted to crankcase. Vibration proof.

★

"STEPPED UP" performance. This new .57 cubic inch Dennymite will out-perform motors of a greater cubic inch displacement! See it today at your dealer's!



DENNYMITE STANDARD 17.85 POST PAID

DENNYMITE UNIT $15.85 Post Paid (Less Coil and Condenser)

HOLDS OFFICIAL WORLD'S RECORD—66.33 M.P.H.

Fresno, May 5th, Harris Dooling and Chuck Felgentrager finished 1st and 2nd in the ½ mile and the 1 mile California Championship—both breaking former world's records! TIME: 66.33 m.p.h. for the ½ mile and 66.00 m.p.h. for the mile. A NEW WORLD'S RECORD!

Tom Dooling won the cup for the most beautiful car. *Buy the world's record combination* —DE LUXE MERCURY MIDGET and the DENNYMITE MOTOR.

"DE LUXE" MERCURY MIDGET RACER

★

NEW "DE LUXE" MERCURY MIDGET

Rear wheel drive—All metal body complete, prefabricated, machined and polished, ready to assemble—Drive unit gears run in oil in totally enclosed housing. Kit (less flywheel and motor)

$23.50 Postpaid

REGINALD DENNY INDUSTRIES, INC.

5751 HOLLYWOOD BLVD. • HOLLYWOOD, CALIFORNIA

Got Your SPOOK Yet?

When we brought out the SPOOK we were convinced we had the best design yet offered the public. As more and more of them show up in hands of the average builders, turning in flights that make experts green with envy they more than justify our claim that the SPOOK is the most advanced design of the year.

BARNEY

FREE!
MODELCRAFT CATALOG
24 pages of
SUPER VALUES

SUPER HOT
New
$1.00 COIL
Weight only 2½ ozs.

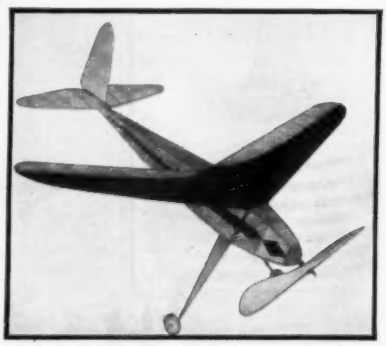
New
SMITH LITEWEIGHT
1½ oz. COIL FOR SMALL SHIPS
$1.75

THE ALBATROSS 45 in.

Towline soaring glider. Here is the large glider you have been asking for. Kit is complete. Add 10c for postage..... **50c**

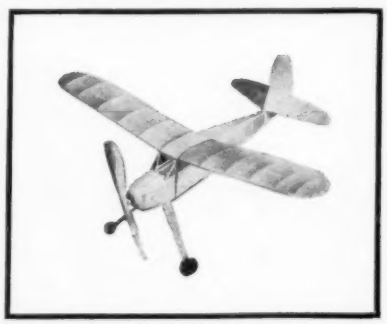
MODELCRAFT SOARING GLIDER
(Towline Glider)

31½" Soaring Glider has turned in many flights of better than one hour. Kit complete. Add 10c Postage..... **25c**



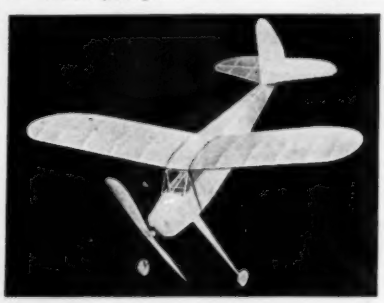
RECORD WRECKER

Newest Modelcraft Sensation! With a 26" span the Record Wrecker includes freewheeling unit, rubber lube, contest rubber, best quality balsa, cement, dope and large full size plans. Add 10c for postage..... **50c**



30 in. PACIFIC ACE

A practical and durable commercial model. Easily constructed from well drawn and detailed plans. Kit contains an ample supply of first grade wood and high quality cement Comparable with and outflies most dollar kits. Add 10c for Postage..... **25c**



CLOUD HAUNTER

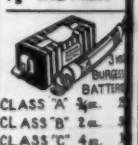
40 in. model, same ship as Pacific Ace, add 10c postage..... **50c**

W. R. Butterfield of Los Angeles made a flight of 2 hours and 40 min. with his Cloud Haunter.

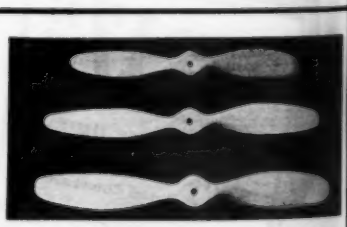
THE CHAMP
Wing Area 191 sq. in.

The name Champ tells the story. It will outfly any model in its class. The kit is complete, nothing else necessary to build and fly the model. Includes free wheeling unit, plenty of rubber, rubber lub and the best balsa you've ever seen. Add 10c for postage..... **$1.00**

MODELCRAFT ACCESSORIES



LOOK! D-G GAS MODEL PROPS



Machine made from straight grain hardwood. Show from 20 to 30% more thrust in every test than any other prop. Put one on your ship and see it climb faster than it ever climbed before. Sold by all dealers and distributors who want to give you the best. Stock up now. Complete range of sizes, 9", 10", 11", 12", 13", 13½", 14", each..... **25c**

★ ★ MODEL

THE LEADING SUPPLY HOUSE OF THE WEST

MODELCRAFT MOTORS

BROWN Class "C"

Model "D" $12.50
Model "C" $18.50
Model "B" $21.50
Model "M" $16.50

OHLSSON "19" Class "A"

.19 Displacement Just right for Miss Tiny $14.50

JUNIOR MOTORS BROWNIE Class "B"

.29 Displacement $7.50
Orders will be filled in rotation as soon as deliveries start.

OHLSSON "23" Class "B"

.23 Displacement Just right for Sky Baby $16.50

MADEWELL Class "A"

Perfect for Miss Tiny. .14 Displacement $12.50

OHLSSON "60" Class "C"

.60 Displacement For Your Spook 72" $21.50

SKY CHIEF Class "C"

Displacement, .526, 1/3 H. P. Bore 7/8", Stroke 7/8", weight 10 oz., with combined and oil $6.95
Postpaid

ATOM Class "A"

Bore 1/2"—Stroke 1/2" Weight 2 oz. $12.50

"A HOT IRON"

SPEED KING

Gas Model Racing Car. Sleek, powerful looking, aluminum body, cast frame, transverse springs, oilite bearings, special racing wheels, kit **$15.00**

SPOOK, THE SHIP THAT MAKES AN AVERAGE MODEL BUILDER A POTENTIAL CHAMPION!

SPOOK 48"
CLASS "A" or "B"

You'll Soon Find Out—
"NO OTHER SHIP CAN CATCH THE SPOOK!"

The first model that can handle an Ohlsson "60" at full throttle

SPOOK 48 IN. Specifications: Wing span 4 ft.; flying weight with Ohlsson "19", 18 oz. Wing loading 8 oz. per sq. ft. Can be flown as class "B" with Ohlsson "23," Hi-Speed or Brownie. Kit complete with cement, dope, covering and wheels..... **$1.50**

Spook 72 in. To date, test flights have averaged over four minutes each using 19 second run. Wing span 6 ft., flying weight 3 lbs. Power with Brown, Ohlsson "60" or other class "C" engines. (The first model that can handle an Ohlsson "60" at full throttle.) Kit complete with cement, dope, covering and wheels..... **$3.95**

MISS TINY—CLASS "A"

May now be flown in two classes. After winning many places in Class "B," including second in the 1939 National Meet, Tiny may now be powered with Ohlsson 19, Bantam, Madewell Mite and other such engines for Class "A." Watch the Tinys take another string of firsts, seconds and thirds in 1940, and watch the present Class "A" records fall to Miss Tiny's superior performance. Get a Tiny and start collecting first place hardware for yourself.

Wing span, 46". **DeLuxe Kit** contains spun cowl, silk, 2½" Voit Air Wheels, cement, dope, die-cut ribs, plenty of good balsa, and full size plans. Price..... **$3.95**

STANDARD KIT same, but with bamboo paper covering..... **$2.95**
DRY KIT complete except for wheels, covering, cement and dope **$1.95**
PLANS ONLY **25c**

HOW IS THIS FOR

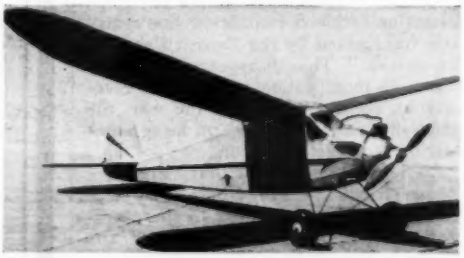
"SPOOKEY" PERFORMANCE

POMONA, MAY 5th

Spook 48 in. flown by Jack Muir did 9 minutes and 11 seconds official, chased his model for 1 hour and 30 minutes, recovered 2 weeks later 47 miles from takeoff point. This was Jack's second ship, his first having been lost at Los Angeles, April 21st, after a flight of over 1 hour duration.

LOS ANGELES, MAY 5th

Spook 48 in. flown by Frank Jefferies turned in a flight of 45 minutes and disappeared. Recovered 10 days later.



SKY BABY—CLASS "B"

Designed for Class "B" engine such as Ohlsson 23, Torpedo, Junior Motors Brownie, this model in its test flights did 15 minutes on a 12 second engine run. Has taken many firsts, including the recent Fresno contest. Wing span 54", chord 7". Kit complete with cement, dope, covering, formed landing gear, air wheels, spun aluminum cowl, etc..... **$3.85**
PLANS ONLY **25c**

PACIFIC ACE—CLASS "C"

66 in. tapered wing. DE LUXE KIT contains taper spars, beveled and tapered trailing edge, die-cut ri turned aluminum cowl, 1 qt. gas dope, 1 pt. ceme 3½ yds. super silk, formed landing gear, 4½ in. flatable air wheels, dural wire, alum. tube, washers, bol haskalite, dural sheet, hook up wire, switch, selected ha balsa, full sized, black and white, plans with test flight instructions, complete..... **$8.5**

STANDARD KIT with bamboo paper, ½ pt. of dope, 1 pt. of cement and 3½ in. air wheels..... **$6.**
DRY KIT same as above without cement, dope, silk or wheels ..... **$4.**
PLANS ONLY **5**

CRAFT

7306 SO. VERMONT AVE., LOS ANGELES, CALIF.

Flash News

(Continued from page 40)

ing craft must be changed. (4) The .30-caliber machine gun is impotent as an air-weapon and a minimum of .50-caliber models must be specified to insure a "positive kill." (5) The trend is towards bigger guns in aircraft, particularly the giant air-cannons of the bombers. (6) Bombers must have tail guns or they are easy prey for fighting ships. (7) Modern bombers must have a much greater range with full overload than we now have.

Newest Navy fighter is the Bell XFL-1, an adaption of the famed Aircobra, single-seat bullet-nosed fighter. Oddly enough, however, the navy has forsaken one of its chief features of design, its tricycle landing gear, and the ship is equipped with a conventional retractable landing gear and tail wheel. This becomes the only liquid-cooled navy plane now flying the navy's colors and definitely presages a return to the most efficient of all engines in view of streamlining advantages. The navy is returning, too, to its original red-white-blue striped rudders as indicated on this new Bell and the new Douglas XSBD-1 dive-bomber.

The United States' first all-plastic airplane is now flying. The Timm low-wing monoplane two-seat trainer took the air for the first time just a few weeks ago with veteran test pilot Vance Breese at the controls. Designed for mass production, the ship is powered by a 160 horsepower Kinner engine, has a 36 feet wing span, a length of 24 feet 10 inches and weighs 2050 pounds. It has a top speed of 150 miles per hour and cruises at 140.

Two unexplained crashes of military planes in Southern California have caused rumors of Fifth Column activities among the aircraft plants. Vance Breese was badly shaken up, and three other flyers killed in the mid-air crash of a photograph plane with the highly touted Vultee "Vanguard" fighting ship. While coming in for a landing after making aerial photographs, Breese in the fast pursuit ship tangled with the big red Lockheed Orion photograph ship and the two crashed to the ground. A second and more disastrous crash involved the first of the navy's huge Douglas R3D-1 (DC-5) high wing twin-engine tricycle transport. With four company engineers aboard, the huge ship took off for a trial run. It developed motor trouble immediately but the pilot attempted to keep the big ship in the air. After a series of wild gyrations the ship plummeted into the ground about a mile west of the company's El Segundo Division factory field and caught fire. Only the charred remnants of the two motors were left. On two other occasions the main power line and water line to both the Vultee and North American plants were cut off for more than half an hour. Fifth Column agents ARE to be found in our aircraft industry!

Three U.S. Army Air Corps officers examined one of England's latest Supermarine-Vickers "Spitfire" fighters at Ottawa, Ontario, Canada recently. Colonel O. P. Echols, assistant chief of the Material Division at Wright Field and two test pilots, Captains G. E. Price and P. E. Shanahan flew the Spitfire in order to "compare its characteristics, performance, speed and general utility as a single-seat fighter with latest models in the U.S. Army Air Corps."

Douglas DB-7B's, for which an order for 400 has been awarded by England, will be powered by Wright Twin Row R-2600 engines equipped with turbine-driven superchargers. Air intake for the completely cowled motors will be provided in the hollow nosed propeller spinner. Top speed has been quoted as nearing the 400 miles per hour mark.

Construction on Vought-Sikorsky's new giant flying boat for American Export Airlines is well under way with completion promised by early 1941.

North American has entered the last remaining field with the design of the model NA-73, a single-seat fighter. Already manufacturers of training, attack, observation and bombing craft, this new Allison powered ship gives the exclusively-military company a complete line of warplanes. The NA-73 features a long tapered nose housing the huge Allison engine, a smooth contour cockpit enclosure, square wing and tail surface tips and a radically new internal cooling radiator with retractable scoop for the Prestone fluid. An order for 800 for England is in the process of negotiation.

Curtiss is now in the process of developing a basic design which may be used for either a single-seat fighter, a light attack bomber, or a medium heavy bomber. Resembling in outline the DB-7 French Douglas Bomber, this new Curtiss will feature a single Allison engine driving twin propellers in each outer panel in the fighter, two Allison engines driving pusher propellers in the attack ship and two Allison "W" 2600 horsepower engines lying flat in each wing in the medium bomber. The design, now undergoing wind tunnel tests, features twin engine mid-wing single rudder assemblies. Allied orders will be negotiated for.

Consolidated's huge XB-24 quadrimotored bomber, recently released for export, is in the process of extensive redesign "in accordance with the latest information received from front line activities transmitted by the British Purchasing mission." Thus, it appears a certainty that with modifications as proved necessary by events thus far in the war, the giant ship may see service in large numbers on the Western Front.

An interesting comparison: President Roosevelt has asked for 50,000 airplanes a year. In the entire history of the American aviation industry, only 40,000 airplanes have been built!

Models on the Fly

(Continued from page 10)

setting your thrust a little to the side you can get the best climb without a stall, getting plenty of altitude before the power cuts out, and giving you a better chance of the power cutting in again while she is coming down.

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away from bees! We've tried it once—once too often! Or you might say the size of the fly would be determined by the size of the plane. You'll just have to learn your flies in order to get the right combination for good flights. Of course the best way is to first build your ship and trust to luck in selecting your power plant. . . . If you can catch it!

Attaching the fly to the plane requires a great deal of care and patience, being sure not to get any glue on his wings or legs. Try to have the fly as free as possible so he can walk and have ample room for moving his wings. If you will note the accompanying drawings the fly is attached about half-way on the front part of the fuselage. (I should say the rear part of *his* fuselage.)

"Jasper" Can Win the Wakefield

(Continued from page 21)

1/16" x 3/16" soft balsa, horizontally and vertically, to brace the wing sockets internally. Do not pull out the wing until all the socket braces are thoroughly dried. 1/32" soft balsa veneer is used to build up the wing fairing on the outside of the fuselage.

Propeller

The propeller is carved in the usual way, using a fairly soft block of wood. You should try to get an airfoil section on the blade, not just "cup" it. The prop should be covered with Chinese silk and doped with several coats of dope. Finish with wax. Make certain that the wire holding the counterweight is imbedded securely in the balsa and bind well with thread. Balance the propeller only after the blade has been completely finished and doped.

Covering

The fuselage is covered with the very lightest grade of bamboo paper. Wing and tail are covered with outdoor colored tissue. All of the tissue should first be shrunk with water before doping. The grain of the paper should run parallel to ribs and cross-members. One coat of dope is used on the wing and tail and two on the fuselage. Fuselage and elevator are yellow and the rest of the plane is doped red.

Motor

Eight strands of 1/4 x 1/30" brown rubber make up the motor, which is 36" long. The length of the motor which is used will vary with different models, so do not take this length as being mandatory. Make certain that the rubber you use has been aged sufficiently and keep it well-lubricated and free from grit. If the slack "bunches up" in your motor, try using the White system of rubber tensioning; i. e., make a four-strand motor 72" long, put a few winds in it, then double it for use in the model.

Adjusting and Flying

The right wing should have "wash-in" and the rudder should be turned to make the model circle to the right. The propeller has a slight right thrust and no down thrust. The ship flies in small circles. If it dives or stalls, put small blocks of balsa between the fuselage and tailboom. It should be possible to beat three and a half minutes consistently with "Jasper." So, here's to long flights!

Cutting Down the Drag

(Continued from page 13)

surface area as small as possible. The results of these and many other tests made on streamline bodies show that this conclusion is indeed correct.

In fact, it may be stated as a general rule, that *for bodies over which the air flows smoothly and without eddies, the drag is directly proportional to the surface area.* This rule immediately has an important application to the problem of fuselage drag. Consider the fuselage design shown in fig. (3). Each of these types has the same maximum cross sectional area and therefore complies with the contest regulations. The first one, marked (a), is the familiar dirigible-shaped streamline form. Type (b) is similar except that it has an elliptical cross section. Many model builders consider both of these types to be excellently streamlined but a little consideration will show that, in the light of the above rule, type (b) should have at least 20% more drag than type (a), because its surface area is about 20% greater. However, there is no need to stop with type (a). By simply shortening the "streamlined" portion of the body and adding a tail boom, the surface area may be reduced still further. Such a design, shown as type (c), would be expected to have even less drag than the commonly used type (a).

This process of shortening the fat part of the fuselage and lengthening the tail boom can not be continued indefinitely, however, for when a certain point has been reached the airflow will no longer be of smooth, eddy free type which we have been discussing but will instead break away as shown in fig. (2), with a resulting tremendous increase in drag. To find just how much may be gained by using the pod-type fuselage with a tail boom was one of the chief objects of this series of tests.

Unfortunately, on an actual fuselage it is usually impossible to obtain the ultimate in streamlining because such protuberances as cylinder heads, landing gear struts, etc., always cause a certain amount of turbulent flow. Such sources of drag can of course be minimized by proper cowling and fairing of the parts.

However there are less obvious sources of turbulent flow which must be avoided if low drag is to be attained. In the first place, not all apparently streamlined forms actually give a smooth flow. Many fuselages have been tested which give high drag in spite of having a round cross section and smooth lines. For this reason the form of a fuselage should never be drawn by eye, but instead should be obtained from a set of ordinates giving the shape of a fuselage which has actually been wind tunnel-tested and proven to have low drag. Even if such a form is used, large drag may be caused by eddies formed by the so-called "interference" of other parts of the airplane. Such eddies form at the junction of the wing and fuselage on a low-wing monoplane, or where improperly designed struts enter the fuselage. Several cases to be avoided, together with their cures, are illustrated in fig. (4),

The test results are presented in the accompanying table. The values given are the drag coefficients obtained at two different

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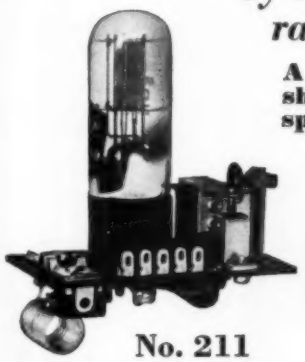

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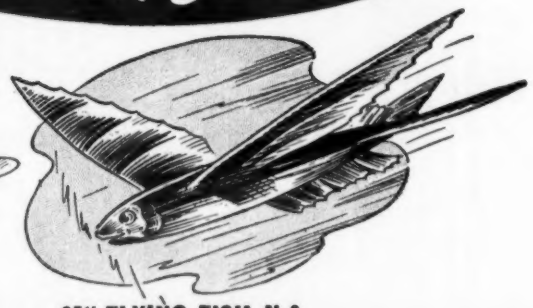

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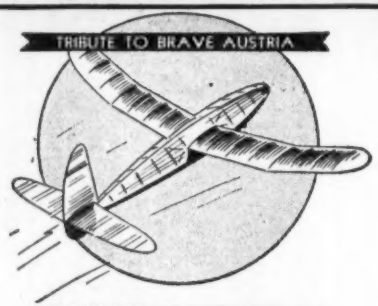

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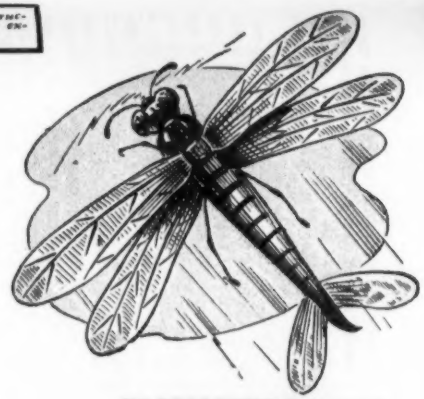

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Reynolds numbers. The left-hand column, which corresponds to the flight conditions encountered by a large gas model, is at the Reynolds number of a 48" fuselage flying at 20 m.p.h. The right-hand column corresponds more closely to the smaller gas jobs, and was taken for a 30" fuselage travelling at 19 m.p.h. There is no great difference between the two sets of values.

If the actual drag is desired for any particular model, it may be obtained from the formula:

$$D = (.000132)\,C_d\,A\,V^2$$

where D is the drag in ounces, A the maximum fuselage cross sectional area in square inches, and V the speed in feet per second. C_d is the drag coefficient given in the table.

The comparative values of C_d for various fuselages, rather than the actual drag, is what interests us most here. Fuselage No. 1, the typical box-car type with a windshield, is seen to give 70% more drag than the best form tested. As may surprise many builders, the square fuselages are only slightly poorer than those of round cross section. Thus type No. 2, has a drag coefficient only slightly larger than the round section of type No. 3. There is really no reason why a square, cross sectioned fuselage should give much more drag than a round one, because the surface area of the square cross sectioned type is only slightly larger than that of the round fuselage. This reasoning holds only when the fuselages are headed directly into the wind. As will be explained below, a square fuselage may be worse than a round one if it is yawed a few degrees.

Type No. 4 is the best dirigible shape tested. Its ordinates are given for use in model design. As might be expected from the discussion above, it is better than type No. 5, the best form with elliptical cross section tested.

Best of all, however, is No. 7 the pod-type fuselage with its reduced surface area. It is notably better than any of the other "streamlined" shapes. Even the pod-type fuselage No. 6, with a square cross section, is better than a dirigible shape with a round cross section. Because of the ease of construction of this type of fuselage, it should find wide application in the design of gas models for contest work. Because this type appears so superior to all the rest, some builders may be prompted to ask why it is not often used for real airplane fuselages or dirigibles. The answer to this question is that in real airplanes the problem is to enclose a given *volume* with the least possible drag, rather than to fair a given *cross section area*. The best streamline shape for enclosing a given volume is one with a length about eight times its maximum diameter, whereas the best shape to enclose a given cross section area is only three times as long as its diameter. On man-carrying soaring gliders, where the problem actually is to build a fairing enclosing the cross section area of the pilot, pod-type fuselages are coming more and more into use.

The curves of fig. No. 6 show the increase in drag caused by yawing fuselages with different shapes of cross section. Since ordinarily models are never yawed as much as five degrees while flying, these curves are mainly of scientific rather than practical interest.

The results presented with this article show the ideal minimum of drag which can be attained. The very important problem of how to avoid drag caused by the various accessories such as landing gears, cylinder heads, etc., will be taken up in the second article on the subject. Until then, happy landings!

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1 .03	.05	.07
1¼ .04	.08	.10
1⅜ .07	.10	.16
3 .15	.15	.30

PROPELLERS

Balsa	Paul-O-Mesh. Cut	Wisa
5" 4c	10c	
6" 5c	15c	
7" 6c	20c	
8" 7c	25c	
9" 8c	30c	
10" 8c	35c	
12" 10c	45c	
14" 14c		
15" 15c	55c	

Hookup wire, ...ft. 2c

CEMENT

COL. or CLEAR DOPE

1 oz.....5c
Large bot.....8c
½ pt.....35c

CLEAR DOPE

½ pt.....30c

TISSUE, AA

All col., doz. 10c
Silver .....ea. 5c
Superfine, wh. 5c

INSIGNIA

24 and stripes 5c

RUBBER

.045 .....25 ft. 5c
1/16 sq...15 ft. 5c
⅛ flat...15 ft. 5c
Skein 55c
3/16 10 ft. 5c
Tubing ⅛....ft. 5c

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WASHERS

1 doz. ⅛ or ¼ 1c

NOSE PLUGS

½".....12 for 8c

18" BAMBOO

1/16x¼ 6 for 5c
Shredded, 36—5c

SPONGE RUBBER WHEELS

pair 1".....15c
1¼".....18c

CELLULOID

6x8.....5c
12½x16 .....19c

RUBBER LUBE

Bottle 10c
Paste, can.....10c

ALUM. TUBING

1/16,3/32,⅛,ft.7c
3/16, ¼, ft. 10c

CELLULOID

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Bushings, 4 for 1c
Austin Timer 1.00

SHEET ALUM.

.0004x4x15
2 sheets 3c
.005 in.—6x6...5c
.010 in.—6x6...8c

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1/16x6" ...doz. 5c
⅛x18".....2 for 3c

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Used motors bought or exchanged. Highest prices paid.

IMPERIAL MODEL AERO SUPPLY

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Gas Lines—Air Ways

(Continued from page 19)

was published. These appealed strongly to the imagination of Mr. Paul Robertson of College Park, Md.; consequently he carefully built a scale model from them. This is shown in picture No. 1 and is an unusually fine job of this famous old ship, one of the first to carry United States Mail.

Picture No. 2 apparently is a large Douglas 0-38 coming in for a landing, but actually it is only a model of the big ship realistically posed by James Dick of St. Helens, Oregon, who built the plane. The little ship has a wingspread of 30", built to 3/4" scale. The motor and cockpit have been carefully detailed, which include movable controls and rear gun. The photograph was taken with an ordinary bullet camera.

Here we have one which will make you rub your eyes. They say "seeing is believing" but this picture, No. 3, seems to disprove this axiom. Apparently it is a flighty young man taking off, under his own power, by means of a set of gas model wings. We might say that this is rather a "flight of fancy" than an actual one and unquestionably the pictorial effect fulfills the

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AN ENGINEERING TRIUMPH . . .

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Everything is in the kit including Champion spark plug, coil, condenser, tank and cap, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, complete instructions, etc. Every part is fully machined and finished. No oil, gas, batteries, or propeller included. A SCREWDRIVER IS THE ONLY TOOL YOU NEED.

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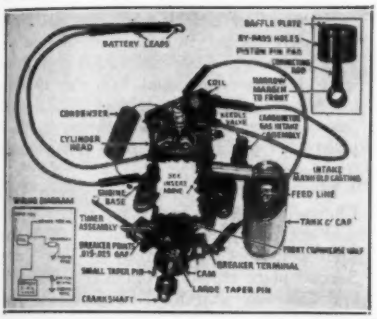

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SPECIFICATIONS

4 Port 2 Stroke Cycle. ¾" Stroke. 15/16" Bore. 300-7,000 R.P.M. Turns 14" Prop. 8" Pitch. Bearing Surface, 1¼" Long. Crankshaft, 5/16" Diam. Weight, 10 oz. (Motor) Rotation, Either Direction. Height, 4½"—Width, 2½", H.P. Approx. 1/5th. Class C under NAA Rules.

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Thousands of Satisfied Users! Read some of these testimonials on file with us:

J. B., Providence, R.I.—"A few weeks ago I received the G.H.Q. motor kit and it is running perfectly. I hope to write you soon and tell you about some excellent flights."

R. H., Prairie du Chien, Wis.—"Your motors sure can take a lot of abuse and knocking around and yet perform perfectly. I have had two in a period of about two years and have seen higher priced motors give less service and performance."

W. W. M., Russellville, Ark.—"I received my G.H.Q. Motor Kit and am very well pleased. I had motor together in 1 hr. 40 min. I will place order next week for G.H.Q. Sportster Kit."

W. L., Claysburg, Penn.—"A wonderful motor that thrills any air-minded person. Strong and neat looking. As good as motors costing twice as much."

A. K., Hillside, N.J.—"I still can't understand how you can put such a dependable and rugged engine on the market at such a low price."

E. T., Sayville, N.Y.—"Received my G.H.Q. Kit okay and am more than delighted with same. You've got 'em all beat for price and performance."

R. P., Hamburg, N.Y.—"I want to extend my personal thanks to G.H.Q. for their prompt service. The motor I ordered was received within 24 hours. Such service cannot be surpassed. I also want to say that I have the motor running perfectly. I shall do all I can to help promote the success of G.H.Q."

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THE G. H. Q. GAS ENGINE CAN BE USED IN BOATS, MIDGET CARS & PLANES WITHOUT ANY CHANGES

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MANUFACTURERS OF

Miniature Gasoline Engines and Model Airplanes

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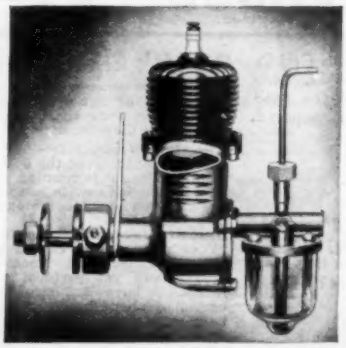
ORDER TODAY — 24 HOUR SERVICE

"In Class A, it's Bantam all the way!"



When a Class A motor takes a Class B ship up "on its nose," and twirls an eleven-inch high-pitch prop like a motor twice its size, it makes modelling history. Well that's the new *BANTAM*, absolutely the hottest thing in 1940 modelling. A motor designed and manufactured by an expert for experts, yet one of the most dependable, most amazingly simple small motors on the market. Sure the *BANTAM* costs a few dollars more . . . but for those few bucks you have the satisfaction of getting the *BEST* in the field. Hear it, try it, buy it, and you'll be convinced.

Top displacement in Class A—.1997 cubic inches; weighs 3.2 ounces; develops full 1/7 horsepower; crankcase fuel injection adds 1,000 RPM; full-lapped piston for long life and maximum compression; die-cast crankcase; tooled steel cylinder; drop-forged shaft; steel piston; foolproof float-proof timer; pronounced perfect by qualified engineers. Don't compare the BANTAM with Class A motors—judge it by ANY Class B engine. Order from your dealer or direct. Write for interesting booklet. **$16.50 P. P.**

MINIATURE MOTORS COMPANY, INC.

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dream of many young model fans. This photo was sent us by Charles Folk of Simpsonville, S. C., and we will let him tell you about it in his own words. He says:

"We build some mighty powerful wings down in this part of the model world. Right near perfect ones, if I do say so myself. Just cast your 'peepers' over these shots of C. W. Todd, as he gets a fine take off and grabs a thermal to set a new record in hang-glider style. Watch that gentle right-hand bank C. W. is taking before he zooms over my head and into the ozone. (I'm the cameraman.)

"After he gained a few thousand feet of altitude, he went out of our sight and it took two days of ardent searching before he was sighted in the top of a pine tree and was rescued. He was in fine shape except for being hungry and having a few scratches on his empenage! As he explained to us, the only way he could get that wing out of the thermal and lose altitude to land was to punch holes in the wing and spill the air!

"Sorry I can't send a shot of the human model at a thousand feet but the film gave out with the two pictures here and he was out of sight by the time more arrived.

"As soon as we get this type of flying perfected a little better, we'll 'Come and see you sometime.' As these shots prove, we live up to our club name, THERMAL CHASERS.

"BULL—MORE BULL—Trick photography is a crazy thing, but it is a lot of fun and pretty deceiving at times."

This is a factual photograph, which hasn't been retouched or changed; however it does come under the head of "trick photography." It was taken looking up a hill at the flighty young model builder, as he jumped into the air from its crest. This gives the effect which is so startling.

Picture No. 4 shows a 1/2" scale U.S. Army autogiro, built by Mr. Lambert of 138 Woodland Street, Worcester, Mass. who worked 350 hours to complete it from a ten-cent kit. This only goes to show that the ultimate production of a fine model does not depend largely upon the material from which it is built, but rather upon the knowledge and craftmanship which is put into it by the artist.

Mr. W. Strittmater of La Crosse, Wisconsin writes as follows:

"There is no better 'up and coming' modeling town than La Crosse, the home of the Thermal Riders. Though we have been organized a scant six months, our membership has jumped from 18 to 50 fellows, an increase of nearly 300%. And all this during a season when most clubs close up shop and go in for hibernation. We have missed only two Sundays of flying and have flown in driving snows and in near zero temperatures. We have inaugurated night flying and in the near future will send some photos of the ships, *taken at night.* We had a night-time contest on record for May 19th and plan to attend the Nationals en masse.

"Last April 14th we held a pitched battle to determine who would become the first possessor of the trophy donated by the nationally-known Heilemans Brewing Co. When the smoke cleared the bystanders observed that Dave Holcomb came out first with the high flight time of 6 min. 59 sec. President Art Millard copped second prize, with Bob Mendall and Ed Conrad trailing. The entire club participated.

"Anyone interested in contacting our club should drop a line to Wally Strittmater, 1530 Jackson Street, La Crosse.

Picture No. 5 shows a group of the club members and their ships.

We hear from Mr. D. S. Halacy, Jr., of 3375 Dale Street, cor. secy. of the San Diego Aeroneers, who writes:

"The Aeroneeers Fifth Annual Gas Model Contest was held April 28th. Saturday before, the weather looked very bad, but fortunately it was good enough Sunday to hold a very successful meet.

"A total of 298 contestants entered, the largest number yet had at the San Diego contest. They came from as far north as Bakersfield, and represented all of Southern California.

Full account of the 1940 Nationals in the Sept. issue on sale August 8th.

"This year the timers for the meet were U.S. Army Air Corps Cadets from Lindbergh Field. The U.S. Marines did a fine job of patroling the field. As at all Aeroneers' meets, the excellent public address system of Walter Church was on hand. Bill Gibbs of Gibbs' Airport, not far from Aeroneers' Field, donated flying time for looking for lost planes.

"Soon after the meet had started long flights began. While the weather was still overcast, Charles Koby set up the winning time of 19:30, after which time his ship passed from sight. Shortly after that Don Jones launched his plane for a time of 15:10. R. O. Spacy, former president of the Aeroneers, had the bad luck of a 23-second motor run on his first flight of over ten minutes. In the second round he lost the plane after four minutes. About noon the sun came out and the wind came up so that planes began going out of sight thick and fast. An estimated two dozen ships flew out of sight. There were a number of retrievers who continually brought in lost planes, one man finding four gas jobs while hunting for, of all things, a rubber-powered model.

"It was four o'clock when the last flight had been turned in and then the prizes were awarded. Besides the $200 cash there were four trophies and 125 merchandise awards for the lucky winners. The first four winners were asked to bring up their planes for pictures but three were unable to do so as they were still lost.

Mr. Van Dusen of the San Diego Aero Club presented the first place trophy which was donted by the Aero Club. This and $100 went to Charles Koby of Van Nuys. Second place trophy, from Kays' Jewelers, and $50 was won by Don Jones of National City. Stanley Johnson of Burbank took third place trophy offered by Baranovs' Jeweler, $20, and the $10 award for the contestant under 16 with the best time. Jack Cramer of Bakersfield won a Bunch Tiger Aero motor for fourth place, also a $5 award for best original design time. Mrs. P. C. Oldershaw of Bakersfield won a Brown Brownie for fifth place and $5 for best time by a woman contestant. In the manufacturers' class Barney Snyder won a beautiful trophy donated by Arden Farms.

"An estimated 3500 spectators were on hand to enjoy the meet."

Picture No. 6 shows Mr. William Van Dusen presenting the trophy to Charles Koby, who won first place with the phenomenal time of 19' 30".

Peter Westburg of 3000 Ocean Park Blvd., Santa Monica, Calif. sends us picture No. 7, showing one of his unusual ships. It is his latest gas model. We will have to let the picture speak for itself for he does not give any of the details in his letter. It has excellent design features; high line of thrust, parasol wing and a center of gravity well below the center of lift but not far below the center of lateral area.

This makes a perfect set-up for all types of flights. Many model builders think that a low center of lateral area is not necessary and that they get excellent flights by putting the area high. Unquestionably this is true. However, they are overlooking one fact; such a model will make only one type

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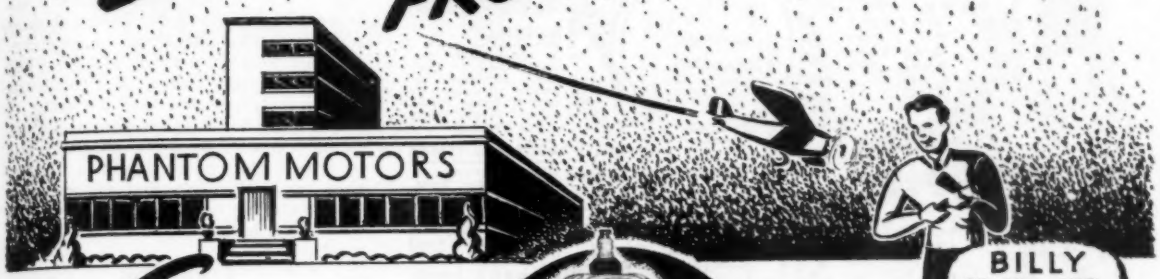

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1st place—TORPEDO, Pueblo, Colo.
2nd place—TORPEDO, Pueblo, Colo.
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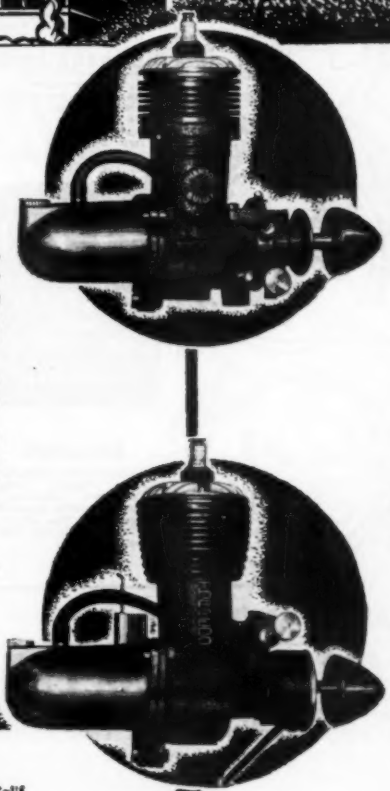
5th place—TORPEDO, Pueblo, Colo.



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1/7 h.p.; 2 cycle rotary valve; ¾" bore; ⅝" stroke; .275 cu. in. displacement; bare weight 4½ oz. Gravity feed carburetion; Diamond bored crankcase; hardened steel timing cam; solid steel case hardened crankshaft; die cast Magnesium connecting rod; lapped alloy steel piston; fully equipped heavy duty radial mounting.

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1/7 h.p. @ 14,000 r.p.m.; 2 port 2 cycle type; bore .725; stroke .724; static thrust 30 to 32 oz. plus; displacement .2989 cu. in.; weight 4 ⅜ oz.; downdraft carburetion; plus size Magnesium gas tank; Champion V-2 spark plug, exclusive offset principle . . . easier starting, more power; metal enclosed condensers; additional crankcase fins; Diamond bored crankcase; oversize anti-friction bronze bearings; lapped alloy steel piston; die cast Magnesium connecting rod; special new type heavy duty radial mounting.

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The Mighty ATOM begins where others leave off! Will outspeed, outpull, outclimb engines of far greater displacement! Will power models up to 32 oz. weight.
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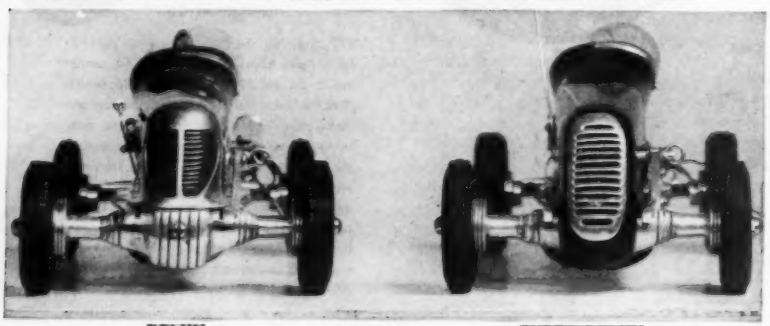

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of flight successfully. While a model of this type is climbing steeply and the nose is pointed upward it will be stable, for in such an attitude the propeller is lifting to a much greater extent than the wing does. Obviously a plane cannot crash as long as the nose is upward and the propeller functioning. In such a case a propeller ceases to be an airplane but in effect is a helicopter. On the other hand, if such a plane flies in a horizontal flight position it will be very unstable and will have a tendency to whip sharply into a spin or spiral-dive. In order to make a model stable for both steep climbing flights and horizontal flights, it is essential that the center of lateral area be on a line drawn from the center of gravity parallel to the thrust line, or from slightly above this line. The further above this line that the center of lateral area is located, the more unstable spirally the model will be when in horizontal flight.

Connecticut

Over 5,000 spectators witnessed the largest gas model contest held in Connecticut. There were 110 model builders registered with their models in the Connecticut Gas Model Championship Contest which was held at the New Haven Municipal Airport on May 30th. The contestants ran into hard luck, as after two weeks of rain, the first clear day came in with a 35 M.P.H. wind which caused many crack-ups. The contest was sponsored by the Elm City Gas Bugs, one of the most active clubs in the state, and was under N.A.A. sanction.

Results of this meet were:

Class A: G. Linder of Stamford, Conn., 55 sec.; A. Hogaboom of Danbury, Conn., 41:8 sec.; A. Corey of Cambridge, Mass., 45 sec. Class B: W. B. Gillette of Noroton Heights, Conn., 1 min. 2:8 sec.; A. Pinel of Quincy, Mass., 57:3 sec.; L. Burk of Everett, Mass., 54:1 sec. Class C: J. Taubl of Noroton Heights, 1 min. 55:8 sec.; W. H. Couch of New Canaan, Conn., 1 min. 33:3 sec.; J. Taubl of Noroton Heights, 1 min. 15:5 sec.

California

The second annual Power Model Airplane Contest was held at the Modesto Airport, Modesto, Calif. on May 26th. It was sponsored by the Junior Chamber of commerce and the Modesto Exchange Club, and was a great success. Messrs. Karl Roth and Art Jenks were co-chairmen in charge of all arrangements. The day was ideal for flying and the meet got under way promptly at 8:30 A.M. Sixty-five contestants kept their planes in the air continually. First place was won by John Drobshoff of San Francisco. He also won the meet at Fresno the previous week. Rod Doyle of Alameda won the award for the Best Construction and Finish. Donald Foote of Oakland took top honors for Novel Construction. The Spot Landing Event was won by Earl Lea of Stockton. Ralph Lowe of San Jose won the Novelty Contest with a perfect exhibition of a parachute release. His plane took off beautifully, circled the field and released the miniature pilot and his parachute, from an altitude of about 150 feet, directly in front of the judges' stand.

New England State Champshionships

This contest was held at Saugus, Mass.

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Brownie Model D $12.50

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This "ground crew" is always available for the quick service and repair of all Brown Junior Motors in action. Send your motor to the factory *now* where a Repair Department of experienced craftsmen does the job perfectly — and reasonably.

To have your motor repaired, return it to the factory and an analysis will be made of your motor. You will receive a repair estimate outlining in detail the report of our Inspection Department. Do this *now* and shoot us the coupon below telling us your motor is on its way. We'll be waiting for it!

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CHAMPION PLUGS 65c

The famous V-1, V-2 and V-3 plugs developed exclusively for high performance miniature motors.

EXHAUST MANIFOLD

May be attached to any Brown Junior Motor. Clips over exhaust ports; and conducts exhaust away from fuselage.

HIGH TENSION LEAD 15c

Finest stranded cable with high tension insulation and phosphorus bronze clips. Lacquered.

PRODUCT OF THE JUNIOR MOTORS CORPORATION

Simply paste this coupon on back of a penny postcard

Brown JUNIOR MOTORS

JUNIOR MOTORS CORP.
2349 N. Broad St., Phila., Pa.

I am sending you Motor # ..... Please inspect and send me a repair estimate.

Name.....

Address.....

City and State..... 6

JUNIOR MOTORS *Accessories*

OK Engines

FOR PLANE AUTO BOAT

START EASILY — RUN CONSISTENTLY

NEW! OK "49"

The "O.K." 49 was designed to fill the gap under the new rules. Will fly a 40 ounce ship with performance formerly attained with .600 displacement motors only.

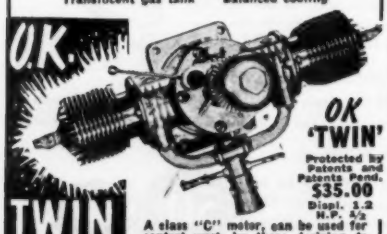
$12.50

COMPLETE with COIL CONDENSER and EXHAUST STACK

A motor for the thousands of ships in existence handicapped by the new rules—a real motor for new type ships on the market now.

SPECIFICATIONS

Displacement ..... .493
Horsepower 1/5
R.P.M. 500-12,000
Flying weight—coil, condenser.... 11½ oz.
Translucent gas tank Balanced cooling



O.K. TWIN

OK 'TWIN'

Protected by Patents and Patents Pend.

$35.00

Displ. 1.2 H.P. ½

A class "C" motor, can be used for contest work by those desiring to fly big ships.

"OK" AIRCRAFT MOTORS

Model	Displacement	Price
49	.493	$12.50
Special	.604	12.50
Standard	.604	16.50
DeLuxe	.616	19.50
Twin	1.208	35.00

RACEWAY AND MARINE: 49 ..... $15.00; Special ..... 15.00; Standard .. 18.00; DeLuxe 21.00

The new 49 motor comes under the newly created B class for miniature car racing.

ILLUSTRATED BOOKLET — Descriptive leaflet with detailed installation diagram sent upon receipt of stamp. Send for yours now!

"OK" ENGINES FEATURED BY LEADING DEALERS

HERKIMER
TOOL & MODEL WORKS
Dept. G Herkimer, New York

on May 19th, with the following winners and times as average of three flights: Class A: Wilfred Brehaut, Jr. of Hingham, 38 sec. Class B: Joseph O'Shea of Saugus, 1:26.5 and Albert Corey of Cambridge, 1:20.3. Class C: Gordon Smith of Quincy, 3.07 and Harvey Gardner of Melrose, 2:30.

Trophies and merchandies were awarded to the winners. A large number of the contestants attending did not fly their ship because of the high wind. There were entrants from New Hampshire, Massachusetts, Rhode Island and Connecticut. Moving pictures were taken at the contest, which will be shown in various gas model clubs throughout New England. We are indebted for this information to Mr. Leonard I. Day, N.A.A. Contest Director, of 119½ North Street, Salem, Mass.

New York

Favored with clear skies and a warm sun, the Schenectady Aeroneers held their twice postponed air model meet yesterday on the Charles Tourtellot farm on the Ballston Lake-Vischer's Ferry Road. Conditions were ideal for flying, members reported—in fact so ideal that Robert Farstad and John Hagadorn each lost a model by having them fly out of sight in the blue sky. Other outstanding flights were made by models owned by Henry Cohan, Bert Decker, Robert Flood and Albert Reed. However, these latter named were more fortunate in that they were able to follow their models until they came down to earth again out of sight of the take off point.

Several gas-powered models were tested, but no official flights were made. President John Schneider directed the meet with Edward Robinson and Judson Creasy, timers; John Miller, weigher, and Paul Lusk, Robert Heineman and Douglas Creasy, field judges.

New Jersey

Results of the second annual contest of the East Paterson Gas Model Club Contest, held May 12th, were:

Class A: F. McElwee of Cranford, 1:43; R. Simmonds of Middlesex, 1:32; F. Ehling of Jersey City, 1:21. Class B: A. Conklin of Westwood, 4:0; T. DuBois of Nutley, 2:09; B; VanWyk of Haldedon, 1:58. Class C: H. Gaouette of Hartford, Conn., 2:25; R. Modersohn of Maplewood, 1:50; F. Ungrich of Spring Lake, 1:06. Workmanship Event: Walter J. Coburn. Stunt Event: Vincent Bonnema.

California

Theodore L. Ravellette of 3124 4th Avenue, Sacramento, a member of the Sacramento Model Airplane Club, writes:

"On April 7th at Mather Field the first gas contest of the year was held. It was sponsored by Weinstock & Lubin Company and directed by Mr. A. R. Timberlake, the N.A.A. director of this vicinity.

"This meet was the largest ever held here in Sacramento; over one hundred and fifty contestants attended and they came from all parts of the state. Prizes offered consisted of a first prirze of twenty-five dollars, with motor kits and supplies going as other awards. Over five thousand spectators attended. A list of the winners follows:

Phillip Smith, 15:56.6; W. J. Mills,

WOWI LOOK AT THESE NEW LOW PRICES!

AUSTIN-CRAFT again takes the lead in giving you Gas Modelers high quality accessories at prices that will really save you money.

AUSTIN FLIGHT TIMERS
Better than ever $1.00

AUSTIN BATTERY BOXES (2 cell type)
Three sizes: penlite, 1" dia.; 1¼" dia., each ..... .35

TWIN EXHAUST STACKS for BROWN or MIGHTY MIDGET
Made of polished dural tubing, 5" long ..... .60

STACKS FOR OHLSSON "19" and "23" ..... .35

BOOSTER PLUG and JACK
Light weight, ⅛ oz. ..... .35

PROP SPINNERS
Replaces prop nut and washer, ¼ oz. ..... .25

METAL MOTOR MOUNTS
(Large) 3½" by 2½" ..... .50
(Small) 2½" by 2" ..... .25

NEEDLE VALVES. Fits all models of OHLSSON, BROWN AND BUNCH MOTORS. BABY CYCLONE, PHANTOM, HI-SPEED, DENNYMITE, BRAT, TROJAN and many others. Complete unit, only ..... .60

FUEL PUMP CANS
Half pint can with pump. For filling tanks or washing dirt off ship or motor ..... .60

SPARK PLUG WRENCHES
(Four sizes). Specify for what type plug ..... .25

SMITH "COMPETITOR" COIL 1.75

SMITH "FIRECRACKER" COIL 2.50

METAL COVERED CONDENSER
Oil and vibration proof ..... .25

VOIT WHEELS
1½" sponge rubber tail wheel .15 ea.
2½" airwheels ..... 1.25 pr.
3½" airwheels ..... 1.50 pr.
4½" airwheels ..... 1.75 pr.

CHAMPION SPARK PLUGS
V, V-2, V-3 ..... .65 ea.

● **NEW CATALOGUE JUST OUT.** A 2c stamp will bring you your copy. Contains 16 pages full of the latest gas model supplies, accessories, kits and motors. Send for yours today.
● **ORDERING:** Take advantage of our super-fast mail order service. Your order filled the same day received. On orders under $1 add 5c postage. Remit by money order, check or stamps. PRINT NAME AND ADDRESS. No C.O.D.s.
● **DEALERS.** Send for wholesale price list and catalogue.

ATTENTION!
BROWN JR. OWNERS

Let us make a new motor of your old worn-out "B" or "D." We can "soup" up your motor to compare in performance to any late type motor of equal displacement. Our complete overhaul service consists of the following: Grinding and honing the cylinder, enlarging the exhaust port, a new cast alloy iron piston fitted and lapped to one ten-thousandth of an inch, new wrist pin, new con. rod machined from strong 17ST dural, crankshaft counterbalanced for smoother running. Returned to you assembled and block-tested in better running condition than a new motor. This service costs you but a fraction of what a new motor of equal performance would.

Send us your old motor with $3.50 in cash or money order and we will have it back to you within 10 days or less.

AUSTIN-CRAFT CO.
431 E. Victory Blvd. Burbank, Calif.

the Sensation of the Year!

COMPARE these important new features never before offered at only.. $1

1. REMOVABLE MOTOR MOUNT. Easy to work on motor . . . no danger of damaging fuselage while making mechanical adjustments (see photo below).

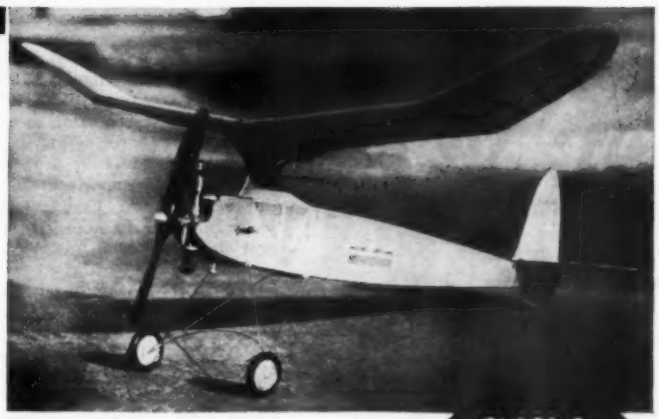
2. ADJUSTABLE SLIDING COIL. Provides perfect flying balance . . . condenser mounted directly behind motor, giving maximum ignition.

3. REMOVABLE, ADJUSTABLE TAIL. Additional ease of carrying. A unit that is less apt to break. Adjustable for perfect flight.

4. ADJUSTABLE RUDDER TAB.

5. PLANKED LEADING EDGE OF WING. Removable wing. Strongest type of construction. Wing not easily damaged.

6. THREE WIRE LANDING GEAR. Maximum strength . . . essential to protect motor and prop.



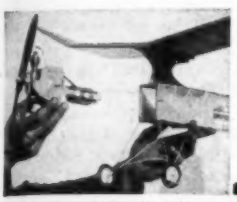
Wingspan 36 inches. Length 26 inches. Weight with Atom Motor 8½ oz. Wing Area 148 sq. in.

Now you can enjoy the thrill of flying this sensational Class A WITHORNET at lower-than-ever prices. Additional models from 50c to $19.95 in our new Pre-Kut Kits or prefabricated Kits.

Send 6c in coin or stamps today for the new illustrated Wit-Kit Catalog.

If your dealer cannot supply . . . order direct.

CLASS A WITHORNET only $1 LESS MOTOR



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No orders shipped C.O.D. Add postage and packing charge of 25c for one or more kits. (Canadian 35c.) On all foreign orders allow 25% of order.

11:33.8; Bill Darneille, 9:35.4; Bill Gunther, 9:24.4; M. S. Weaver, 7:55.6.

Michigan

An interesting newspaper clipping from a Jackson paper reads:

"Two planes failed to return to their base.'

"Not a news flash from the war overseas, but a telephone report from Pete Dillon, a founder and ardent supporter of Jackson's Gas Model Club. Dillon resides at 608 W. Morrell St. and has been tinkering around with model planes for many years.

"Friday afternoon another youthful fan, Jr. Logan of 131 Fern St., shot his rubber powered model into the air out near Leoni and in seven minutes the tiny ship disappeared in the clouds and was never seen again.

"Logan came to report his 'missing' ship to Dillon who took one of his older models out to the end of Morrell St. This was also a rubber powered model and it soared to great heights, was visible for 9 minutes, 45 seconds after which it, too, disappeared.

Dillon says the club plans a serios of exhibition flights Sunday afternoons. They will take place on old US-12 about three miles east of Jackson. The program will open at 2 o'clock if weather is favorable."

The plane lost by Mr. Logan was found and returned two days later.

New Jersey

The Queen City Gas Model Club of New Jersey, 1800 Myrtle Avenue, Plainfield, held a very successful third annual gas model contest at Hadley Airport on May 18th. There were about 100 entries, some of which came from as far away as Virginia. The day was very hot but a little windy for gas model flying. Dick Everett, the 1939 National Champion, came from West Virginia to take first places in both the Class A and Class C-D events.

Illinois

On Saturday, May 18th, the YMCA of the University of Illinois held a model contest in which Bud Bowman won first places in the Class C and Open Events. The contest was held at the Illini Airport, Champaign. In the Class C Event Bowman's average time was 1 min. 37 1/3 sec. Sec-

(Continued on page 61)

Skyrocket With Wings

(Continued from page 27)

carrier-deck-hook is provided beneath the fuselage just forward of the tail wheel.

Power is supplied by two Wright Double Row Cyclone 14 engines model GR-2600-A5D, each developing 1200 horsepower maximum at 2300 r.p.m. at 8000 feet. This engine makes 1500 horsepower available for take-off and five-minute maximum engine run time. It operates on 87 octane fuel and has a blower ratio (supercharger) of 10.1. The motor weighs 1950 pounds, and swings a Hamilton Standard three-bladed all-metal Constant Speed propeller of 12 feet in diameter.

This Constant Speed Control Governor limits the engine speed from High Pitch, which gives a low r.p.m. of 1750 to Low

USE A **Smith** IGNITION COIL

AND HAVE LOTS OF HORSEPOWER

The leading high-grade engines on the market protect their reputation by using the best ignition equipment available. Your dealer will be glad to supply you with SMITH IGNITION COILS on your next engine if you so request.

The COMPETITOR 1½ ounce	$1.75
The FIRECRACKER 2½ ounce	2.50
The BIG SHOT 5½ ounce	3.50
Airplane metal condenser	.25
Race Car Hevi-duty condenser	.45
Radio Control Booklet	.25

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BUD WARREN Says:

FIRST *Manufacturer's Award — San Diego Aeroneers Contest — April 28th.*

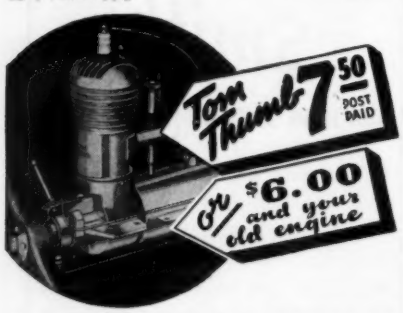
SECOND—*In field of 280— Pomona Meet — May 5th.*

"THE contest season is on! Every model flyer hopes to be the little man that WAS there' when the first prizes are passed out. Those who make top ranking duration flights in competition depend on many things for consistent results. Dependable, reliable engine performance is of first importance."

"Whether you fly to win meets, conduct model experiments, or just 'haul off' and make one flight after another the Tom Thumb motor will not let you down. The Tom Thumb is not the largest model engine nor is it the small bore type. The Tom Thumb is just right for your model of 4 to 6 ft. wing spread."

SPECIFICATIONS and HOW to BUY the NEW TOM THUMB

The Tom Thumb is the most powerful easy starting 1/5 H.P. engine made. Clip the coupon below, enclose money order for $7.50 (also your old motor for special $6.00 offer), and receive a *brand new* assembled and block tested Tom Thumb. Complete with fuel tank, coil, Champion spark plug, one piece cylinder and head and other modern features. Complete flying weight 10 oz. (less batteries). Bore 7/8"; Stroke 3/4".



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☐ Rush me one new Tom Thumb Engine. I enclose $7.50.

☐ Rush me one new Tom Thumb Engine. I enclose $6.00 and my old engine (any make) including all parts regardless of condition.

I intend to run my Tom Thumb— ☐ Upright ☐ Inverted

Name .....
Street .....
City ..... *State* .....

Pitch, which gives the engine its maximum r.p.m. of 2300. Blade angles are 13 degrees for low pitch and 18.5 degrees for high pitch. Operation is hydraulic when changing from high pitch to low pitch, but the reverse operation is accomplished by centrifugal force acting upon the blade counterweights. These propellers will be used on the service-type ships although the experimental Curtiss electric full-feathering type has been installed on the first ship.

The engine is attached to the motor mount by means of nine bolts which are shock mounted on "Lord" type rubber bushings. This permits free rotational vibration but limits the longitudinal vibration of the engine as much as possible. The starter, starter motor, generator, oil pump, fuel pumps and hydraulic and vacuum pumps are located on the rear of the engine. The oil tank is mounted in the rear upper portion of the power plant compartment just forward of the firewall and each tank has a capacity of 14.5 gallons of oil. The carburetor air intake is located atop each engine cowling which routes the cold air to the down-draft type carburetor. Hot air is taken to the carburetor by means of a muff assembly located around the engine exhaust manifolds. An additional line routes this hot air to the cockpit to provide heating for the pilot.

The fuel tanks are located within the wing center section. There are two main tanks with a total fuel capacity of 187 gallons of fuel with an auxiliary tank located within the fuselage just aft of the cockpit which provides an emergency capacity of 22 gallons. The fuel is taken to the engines by means of individual engine driven fuel pumps provided with cross feeds in such a manner that in the event of a pump failure, any one pump can be used to suck fuel to both engines.

The landing gear is of the single-leg half-fork type and retracts to the rear and upward into the aft end of the engine nacelles. Retraction is by hydraulics and pressure relief and ratchet valves are provided to insure the landing gear's smooth operation. Both up and down position landing gear latches are provided with two systems of warning used: a warning horn which sounds when the throttle is closed and the landing gear is still up and one when either one of the latches is not closed. A foot vibrator is also used on the left rudder pedal to bring an unsafe landing condition to the pilot in the event engine noise prevents his hearing the horn. The wheels are 27-inch streamlined type and are mounted on oil-air combination hydraulic struts.

The pilot's cockpit on the prototype ship has been equipped with little of the service instruments it will use but has been crowded with experimental test equipment. Complete flight and navigation instruments will be called for by the navy, including transmitting and receiving radio equipment, marker beacon receiver, radio compass loop, gyro instruments and complete Autosyn remote control engine instruments. However, only the bare flight instruments will be installed when and if the ship goes into foreign service with the Allies, it having been declared available for export.

Armament aboard the XF5F-1 consists of a number of alternate arrangements of medium and heavy bore aerial cannons, but eight guns can be carried in all, two heavy cannon in the nose of the fuselage and three machine-guns in each section of the center section all firing outside the arcs of the two propellers, another outstanding feature of the design.

An extremely heavy alternate load may be carried in the event of long-range duty calls. An additional 50-gallon tank may be installed in the baggage compartment located behind the cockpit with lines and pipe connections already provided for that purpose. Flare racks, emergency flotation equipment in each outer wing panel in the dihedral section, signal flare pistols and oxygen equipment for high altitude work may be carried with brackets and provisions already made for their installation.

The Grumman XF5F-1 "Skyrocket" has a wing span of only 42 feet and is just 28.5 feet long, giving a graphic indication of its compact design. It has a total gross weight of 7,682 pounds of which more than 1,000 is disposable payload.

Performance figures are of course highly confidential and no indication of the exact figures will be released either by the company or by the navy. However, both have made authorized statements to the effect that it is the fastest fighting plane in the entire world which would, of necessity, place its top speed close to the 450 miles per hour mark. However, its chief claim for international recognition is the statements, also approved, that it is the fastest climbing ship of any type in the entire world. It would therefore have to climb at least 6,000 feet per minute to justify this claim.

According to Grumman test pilot Robert Hall, the ship has its maximum top speed at 16,000 feet, and has a landing speed of only 70 miles per hour which is very low for a high speed ship of this type. He has taken the ship completely off the ground in less than seven seconds which is an illustration of its fast climbing characteristics. In its preliminary naval trial demonstration by the company test pilot the ship literally flew a regulation Grumman navy fighter out of the sky.

The need for a long-range single-seat fighter has been sorely expressed by the Allies. With plenty of interceptor-type fighters whose endurance is less than three hours on most types, the Allies have had no fighter capable of accompanying their-long-range bombers on missions of 1200 miles and more which might be one reason for the complete lack of Allied bombings inside Germany. However, this new Grumman, with its extra fuel load, its heavy armament, its fast climb and high top speed may be just the answer to the Allies' cry for a ship to win their war. In the event of a large order, Grumman's present limited facilities for mass production would be augmented by the nearby Republic, Brewster and Curtiss plants.

TELL US WHAT ARTICLES YOU LIKE BEST IN THIS ISSUE OF MODEL AIRPLANE NEWS

SPECIFICATIONS
Weight 3 oz.
Bore 39/64". Stroke 5/8".
Displacement 191 cu. in.
Class "A" N.A.A. Rules
R.P.M. 700-12,000
H.P. 1/8 at 7,500 R.P.M.

$10.95 Complete with Smith Coil, Spark Plug and Condenser

"PERKY"

The New Class "A" Champion

The Power Plant That Packs The Punch

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"PERKY" is the only motor that combines all the features necessary for a perfect Class "A" power plant in one COMPACT—DEPENDABLE—TROUBLE-FREE UNIT.

Perfectly streamlined—with twin exhaust stacks for super power—throttle-controlled carburetor—enclosed timer, instantly detachable for cleaning—either firewall or skid mounting brackets—and supercharged to such degree that its port area is more than double that found on other motors.

POWER YOUR NEXT JOB WITH THE MOTOR THAT PERCOLATES EVERY TIME.

Licensed under Patent No. 1,795,314, and patents pending

At Your Dealer's or Order Direct

BAYCRAFT MINIATURE MOTORS

23 MINER ST.

BOSTON, MASS.

The "Answer" for Gas Fans

(Continued from page 15)

plates from the pattern on Plate 2. These may be cut from any scrap sheets but should be at least 1/8" thick. Place one of these at the center section, another nine inches out on the wing and another four inches from the tip. This step is shown clearly on Plate 3. The one-third/two-third line on the template is matched with the corresponding line on the wing plan, and these templates are pinned in position over the plan.

To achieve best results next soak the wing outline in hot water and bend it over the jig, using pins and cement to hold it in shape. Although the wing templates will not be used in the finished wing, cement the wing to them in the forming step. They may be easily removed later. The assembly should be allowed to dry thoroughly.

The wing ribs are cut from 1/16" medium sheet balsa using a wing rib template cut from 1/16" plywood to form both the top and bottom curves. On the sheet of 1/16" balsa from which you are cutting the ribs, draw a vertical line about 3 inches from the end of the sheet. Place the template on the balsa sheet, matching the one-third/two-third line on the template with the line you have already drawn. Cut the top curve of the rib, move the template down 1/4" and cut the bottom curve. Move template down another 1/4" and cut another rib. This process is repeated until all 36 ribs are cut.

Place the ribs on top of the outline, upside down, making sure that the one-third/two-third line corresponds to that on the plans. Hold each rib in place and cut off at the leading and trailing edges until it is of proper size. Turn the rib over and cement into place. This process is carried out for the entire wing.

Repeat the entire process to complete the other half of the wing. When both halves are complete, they should be joined. Bevel these halves at the center section to form 3 inches of dihedral at each tip. Cement this joint thoroughly, applying several coats.

Sand the leading and trailing edges to a streamline shape as shown on the typical wing section, Plate 1. Cover the center joint with a strip of 1" gauze, top and bottom and cement thoroughly.

As a final step, cement one of the wing rib templates at the intersection of the two halves on the bottom, to act as a stiffener. Trim this section on the bottom as shown on the lateral view of the fuselage.

Cover the bottom of the wing first with light bamboo paper using cement as an adhesive. Be sure to cement the paper to each rib. In covering the top it is only necessary to apply cement sparingly to the leading and trailing edges. Water dope the entire wing when covered and after drying apply three coats of dope to the wing, top and bottom. You will find that the wing warps up slightly. From this point on keep doping the TOP of the wing giving it sufficient coats until it warps up giving a dihedral of 5" on each tip.

CANADIANS—Investigate the Drimmie Model Aircraft Engines. Made in several models at popular prices. Ask your dealer or write us.

H. Drimmie & Son,
193 Gainsboro Road, Toronto, Ont., Canada

The Lightest Coil Made

Aero featherweight

Aero engineers have succeeded in inventing the lightest coil made. Weighs only 1½ oz. Specially made for two batteries (3 volt).

FEATURES: Lightest coil made—Step up engine speed—Save on batteries—Every coil is factory tested for spark-length, spark-heat, and ability to fire carbonized plugs.

AERO COILS
are recommended and sold by:
BERKELEY, COMET, MEGOW, MODEL-CRAFT, POLK,
and all reliable dealers.

THE AERO FEATHERWEIGHT COIL 1½ oz....$2.25
THE AERO SUPER COIL 2¼ oz....$2.25
THE AERO QUALITY COIL 2¼ oz....$2.50
THE AERO RACER COIL 2¼ oz....$2.25
THE AERO TWIN COIL for two cyl. engines, 4 oz....$5.00
NOTE: All coils are equipped with high-tension snap-on leads.

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37-30—81st Street
JACKSON HEIGHTS, L. I., N. Y.

They Fly!

New records being made every day . . . ask your dealer to show you all 4 models!

"FLYING FIFTIES" — Ideal Models — AT DEALERS $1 — BY MAIL 20c EXTRA

50" WINGSPANS
not shown: STINSON 105
photo SPITFIRE and NORTH AMERICAN TRAINER *kits*

"MOLECULE"
the NAA Class "A" prize winning GAS JOB
powered by
MIGHTY ATOM, $12.50 p.p.
$1.95 LESS MOTOR — by mail, 20c extra

Rubber Powered
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Specializing in tow-line launched
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DECOSTA CAMERA PLANE
"A picture every flight"
Span 52" Wt. 24 oz.

Presenting the first aerial picture-taking model airplane kit. This beautiful gull wing job has proved itself a fine performer and has taken some excellent pictures from the air.

FEATURES—Camera mounted on hinged door in bottom of fuselage, completely enclosed except for opening for lens. Demountable wing that slides off in case of crash. Demountable engine unit. Very stable design.

KIT CONTAINS—Finest grade wood, cut-out ribs and formers, red bamboo paper, ½ pint cement, ½ pint dope, hardware, ignition wire, full size plans, complete illustrated instructions, hardwood wheels, UNIVEX CAMERA AND ROLL OF FILM.

Standard Kit, $3.95, plus 15c post.
Deluxe (same as above but with finished prop and M&M airwheels), $4.95, plus 15c post.
Recommended engine . . . Ohlsson "23" . . . $16.50 p.p.

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TEX FOSTER
106-06 Jamaica Ave.,
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Hours 10 A.M. to 9 P.M.
● Sail boats ● Plans ● Fittings.
● Sails made to order.
Flying, Scale model kits & Supplies.
Gasoline Engines Kits and supplies.

The Fuselage

In building the fuselage, construct both sides over the plans. Note that 3/16" square medium balsa is used for longerons and uprights, except where noted. See plate 2 for construction of the motor mount. The motor mount bearers are of pine, cemented directly to the top longeron and are made with each side as an integral piece of the construction. When the two sides are completed, invert the sides on the top view of the plan and cement the cross braces in place. Cut the bottom cross braces and complete the bottom of the ship to the dimensions shown on the bottom view. The formers are shown in full size on plate 3. These should now be cemented in place. The cabin, of 3/16" square balsa, is now built on the fuselage and when this is completed the 1/8" square stringers are cemented in place from the cabin top to the tail, as shown.

The construction of the nose is shown on plate 2. Note the position of the two firewalls. The first one is of 2-ply (two layers) of 1/16" sheet balsa. The second, which supports the landing gear, is of 1/8" birch plywood. The sides of the nose, which are of 3/16" soft sheet, cement to the motor bearer and the first of the two firewalls. Between the sides of the nose, cement a block of soft balsa. Cut this piece inside to accommodate the depth of the motor used. When this assembly is thoroughly dry, "butcher" the assembly until it conforms to the outlines of the nose shown on the plans. A sand block (a piece of 2"x3" wood with sandpaper wrapped around it) may be used in this "butchering" process After sanding to outline cover with several coats of cement, sanding between coats until a smooth finish is obtained. The landing gear, of 3/32" wire, is bound and cemented to the second firewall.

The underslung, which is really a continuation of the rudder, is made with the fuselage. Formers 7 and 8 are cemented in position and the curve section, of 1/8" sheet balsa is cemented in place. Be sure this assembly "lines up" with the rest of the construction. Sand the entire fuselage down before covering. The underslung, of course, should be sanded to airfoil edge.

Cover the fuselage with silk, which should be wet before application and applied when still damp. Apply the silk first, then cement to the longerons. The cement goes through the pores of the silk and adheres to the wood. When dry, give the fuselage 5 to 8 coats of clear dope before painting. The dowels of 1/8" birch may be inserted after the covering has been completed, being cemented as shown.

Tail Assembly

The trailing edge is cut from 1/4" soft sheet balsa. It is placed over the plans and pinned in position. The leading edge of 3/16" square hard balsa should be soaked in water and pinned in position. The spar and ribs, of 1/8" by 1/2", are then cut and inserted as shown on the plans. Cement securely at all points and when dry use a pen-knife or sand-block to cut the ribs down to meet the leading and trailing edges, which are sanded to airfoil section.

The rudder outline is cut from soft 1/4" sheet balsa. Ribs and spar are of 1/4" by 1/8" stock. When the assembly has been completed sand to airfoil section.

Cover the elevator and rudder separately, with light bamboo paper. When each unit is covered, water dope, let dry and give several coats of clear dope. It is best to complete the painting of this assembly before cementing the rudder to the stabilizer.

Motor Mounts

The motor mounts proper are bolted to the inside of the motor bearers. Note that only one bolt is used for each, this being sufficient for Class A or B motors. Holes are drilled to fit the motor used. The nuts for the bolts which hold the motor are cemented to the bottom of the mounts to aid in removing the motor at a later date. The mounts are shown inserted.

Wiring

The position of the battery box, timer and coil are shown in the fuselage by dotted lines. Any standard wiring diagram may be used.

Adjustments

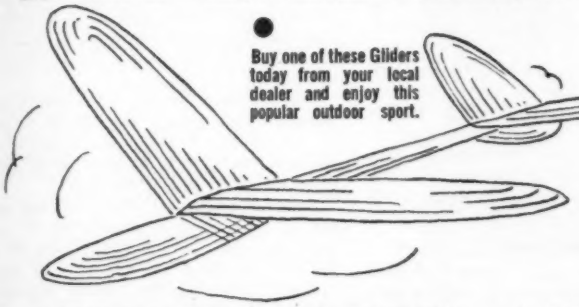
The plane, when completely assembled, will balance at forty to fifty per cent behind the leading edge, depending upon the motor used.

Test glide the ship on a calm day. Be sure and point the nose slightly down when gliding, otherwise it may go up

For Fun—Action—Excitement

BUY THIS GLIDER 19c EACH

An all-balsa, 20 inch wing span, precision designed Glider. Will ride the air currents from one to sixty minutes. A beautiful "SAILOR"—easy to assemble—extremely low in price.



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The SAILOR

PARTS . . READY CUT

The PEERLESS MODEL AIRPLANE CO. Cleveland, Ohio

West Coast Distributor: OFFENBACH'S HOBBY-CRAFT SUPPLY CO., 1452 Market St., San Francisco, Cal.

from the hand, stall and dive in. If the ship dives, insert pieces of 1/16" sheet balsa under the trailing edge of the stabilizer. If it stalls put the balsa pieces under the leading edge of the stabilizer. Do not make adjustments on the wing.

Additional adjustment, tried successfully, is to "wash in" the left wing and give the ship left rudder. The wing may be "washed in" by steaming the assembly after completing.

Properly adjusted the ship should show a flat, slow glide slightly toward the left. When you feel these adjustments have been made, a flight under power may be tried.

Flying

Here's a bit of advice. Don't open up the motor on the first flight. Give the ship a 20 second motor run under low power and watch that first trip "upstairs." The ship should circle to the left both under power and in the glide. This eliminates that dip when the motor cuts and saves valuable feet of altitude gained on the motor run.

You'll find the ship rugged, dependable and "The Answer" to your demands of a small ship. Fly it until you are familiar with every adjustment and it will "clean up" in any contest. It's just what we wanted it to be.—"The Answer."

Gas Lines—Air Ways

(Continued from page 57)

ond place went to Walter Wilson with 1 min. 8 2/3 sec. Bowman won the Open Class Event by keeping his plane aloft for 1 min. 48 sec. John R. Boyd won the Class A with Charles King second. Kenneth Snapp won the Class B event. Sidney Hettinger won the Crack-Up Prize on the afternoon's first competition flight. His small Taylor Cub model was completely destroyed. Strong winds and intermittent rainfall hampered the contestants but a "good time was had by all."

AIR WAYS
Ontario

On June 2nd the Chatham Gas Model Club of Chatham, Ontario, Canada held its first contest. All rubber powered models were classed together inasmuch as it was uncertain whether or not the meet would draw a large number of entries. Lavalle Walters of Windsor won first among the fifteen entries. J. Wood of Windsor was second and Josyet Papineau of Windsor, third. The best flight of the day was 12 min. 7 sec. Gas models were also classed in one event; the winner, Phil Reaume, making 13 official flights. J. Comber was

AIRPLANE

TALK! $KYWAY IS THE BUYWAY FOR

ALL GAS MODEL SUPPLIES & COMET, SCIENTIFIC, BERKELEY, CONTINENTAL, IDEAL & BAY RIDGE KITS

18" BALSA STRIPS Select, Hard Stock

1/16 sq. 60, 5c
1/16x1/4 35 for 5c
1/16x3/16 18, 5c
1/16x1/4 15 for 5c
3/32 sq. 30, 5c
18". Double the above price for genuine aircraft SPRUCE.
1/4x1/4 10 for 5c
3/16 sq. 8, 5c
1/4 sq. 6 for 5c
1/4x1/2 3 for 5c

18" Balsa Sheets

1/64x2 6 for 10c
1/32x2 9 for 10c
1/16x2 8 for 10c
3/32x2 7 for 10c
1/4x3 ...6 for 10c
3/16x2 3 for 8c
1/4x2 ...3 for 9c
1/2x2 ...2 for 11c
3" & 36" cost twice 18"; 3x36, 3 times.

NOSE BLOCKS

1x2x1 1c | 3x3x1 4c
2x2x1 2c | 3x3x2 7c
2x2 1/2x1 3c | 3x3x2 9c

5 FOOT BALSA

1/8x3/16..12 20c
1/8x1/4.....10 20c
3/16 sq.... 8 20c
1/4 sq..... 6 20c
1/4x1/2..... 3 20c
3/8 sq..... 2 20c
1/2 sq..... 2 20c
Sheets, 4 times 18". Double the above price for genuine aircraft SPRUCE.
1/8 sq. 30 for 5c
1/4x3/16 12 for 5c
1/4x1/4 10 for 5c
3/16 sq. 8, 5c
1/4 sq. 6 for 5c
1/4x1/2 3 for 5c

18" Balsa Planks

1/2x1/2.....2 for 5c
1x1.....1 for 5c
1x2.....1 for 9c
2x2.....1 for 16c
2x3.....1 for 22c
2x6.....1 for 38c
3x6.....1 for 72c

Plastic Balsa

4 oz. 23c, 1 oz. 10c

PROP. BLOCKS

1/2x3/4x5 7—5c
1/2x3/4x6 6—5c
5/8x1x8 3—5c
3/4x1 1/4x10 2—5c
3/4x1 1/4x12 2c ea.
1x1 1/4x12 5c ea.
1x1 1/2x15 6c ea.

PLYWOOD

1/16, 1/8, 1/4 40c ft.

GAS MOTORS

No Premiums or Packing Charge on Motors. P.P. 15c.

Ohlsson "19" $14.50
Ohlsson "23" 16.50
Ohlsson "60" 21.50
Forster $17.75 Ball Bearing 19.50
New Forster "29" Class B 15.50
"O.K" Special 11.80
"OK" Twin—for Radio contr. 35.00
Dannymite $13.85 De Luxe 17.50
Brown Jr. "D" $12.50 "B" 21.50
Brownie 7.50
Mighty Atom 12.50
Madewell Mite 12.50
New Bantam 16.50
Mighty Midget $9.50 Kit 7.85
Gwin Aero $12.00 Kit.... 9.85
Tiger Aero 16.50
Syncro B-.30 ..... 6.95
Sky Chief 6.95

Big Allowance For Old Motors

CEMENT

CLEAR DOPE THINNER
Banana Oil
1 oz. 5c, ½ pt. 30c
2 oz. 9c, pint 50c

Colored Dope
1 oz. 6c, 2 oz. 11c
½ pt. 35c, pt. 60c

MICROFILM RUBBER LUBE
WOOD FILLER
1 oz. 9c, 2 oz. 15c

GAS MODEL SILK
H'ry qual. 45cyd.
AA TISSUE
All col., doz. 10c
Silver.....ea. 4c
Superslik wh. 5c

Bamboo Paper
White or Pervel 5c each 6 for 25c
Colors, 2 for 15c

NEW SILKSPAN
White, Red, Yellow, Orange, Blue 3 for 25c.

Trexler Wheels
Per pair—P.P.
1¼, 1½—40c
1¾, 2—50c
2¼, 2½—60c
Gas Mod. 2¾—$1
3-1.25—3½-1.50
4½-1.75

M&M WHEELS
Per pair—P.P.
1¼, 1½, 1¾—50c
1¾, 2, 2¼—60c
Gas. Mod. 2¼—90c
3¼ 1.50, 3½ 2.75
4½ 2.75—6" 4.00

PROPELLERS

Balsa	Paulo Ritz Wisa	Gas
3- 4c	7	Mod.
6- 5c	9- 8-35c	
7- 6c	12- 9-35c	
8- 7c	15-10-35c	
9- 8c	19-11-35c	
10- 9c	23-12-35c	
12-10c	28-13-35c	
14-12c	40-14-35c	
15-15c	50-15-35c	
16-16c	X-16-35c	
18-25c	X-18-1.00	

RITZ Unfinished
8-9-10-11 .....15c
12-13-14 .....15c
15-16 .....35c
17-18 .....50c

GAS MODEL ACCESSORIES

Champion Spark Plugs ½ or ¼ 65c
Condensers—Metal, 13c Smith.....25c
Plugs & Jacks, Set of 2-35c val. 25c
Midget Tip Jacks 20c val. 2—15c
Terminal Clips 4½" 10c val. 4— 5c
Gas Funnel, Alum. strainer.....25c
Spaghetti Tubing 1/16" 3 ft.—10c
Toggle Switch 50c val.....25c
"3 to 1" SAE 70 oil—½ pt.....25c
12" High Tension Lead—Best...14c
Booster Leads—50c Val.....35c
Masking tape—¼x36-Instruc. card 5c
Alligator Clips—5c Solderless.....10c
Xh'st Manifold—Keep Ship Clean
Nickel plated 50c. Streamlined $1.00
Spark Plug Wrenches—any size....25c

COILS—P.P.

Smith 3 V...$2.50
1½ V..... 3.00
Superlite ...$1.95
Powerhouse $1.50
Wing & Tail Light (3 in a set) 5/16 ..... 8c
9/16 ..... 10c
11/16 12cperset

TIMERS—P.P.

Austin $1.00
Dural 1.95
Robot 2.50
Time-sire.... 1.00

SPRAY GUNS
Small 59c
Large Size: 2 Jars, 97c

Tail Wheels
1" DoNut 10c
Knee - action..75c

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BONA FIDE DEALERS Write for **WHOLESALE PRICE LIST.**

ALUM. - BRASS tubing

tubing Per foot			
1/16	.6c	....	8c
3/32,	1/8	.7c	10c
3/16	1/4	.9c	12c

Sheet Alum.—ft.
.003 10c .010 15c

ALUM. LEAF
3 sheets.....5c

Dural Angle
1/2 x 1/2 .....15c ft.
3/4 x 1/2 .....22c ft.

BOMBS
3/4" .....2 for 5c
1 1/4" ....2 for 11c
2" Torpedo 10c

AUTO RACE CARS—P. P.
Bunch Speed Demon.....$16.50
Syncro Rocket..... 19.00
Denny—$19.50—"DeLuxe" 23.50
Speed Chief..... 12.50
Speed King..... 15.00

RUBBER-POWERED ACCESSORIES

Model Knife, Surgical Steel Blade 10c
Model Pins ½ or 1" 100 for 8c
Sheet Celluloid 5x7 4c, 14x17....15c
Ball Bearing Washer 10c value..... 8c
Sandpaper, 12 sheets 5x5..... 5c
Lilliput Lights—for display model.
3 lamps, wired, instruc. sheet...85c
Insignia 36—American, French, English, German, Squadron, in colors, gummed, per sheet..... 5c
Washers, pinhole, 1/8, 1/4, 2 doz. 3c
Prop Shafts, doz ass. 6c, large....10c
Ball Bear: 1/16 15c ea. 1/8..... 23c
Nose Plugs for 5c; 1/2"—d, 3/4"—6, 1"—4.

MUSIC WIRE finest quality

.014	6 ft.	2c	
.020 .028	6 ft.	3c	
.034 .040	6 ft.	6c	
.049	6 ft.	8c	
1/16"	3 ft.	5c	
3/32"	5 ft.	15c	
1/8"	5 ft.	20c	

WHEELS per pr.

Brsh	Bisa	A Colu	L
1/4	.01	.03	U
3/8	.02	.04	.05 M.
1	.03	.05	.07 .06
1 1/4	.04	.07	.10 .09
1 1/2	.06	.10	.16 .12
2 1/2		.12	
3		.15	.30

BROWN RUB'R

1/16 sq. 15 ft. 5c
1/8 flat 15 ft. 5c
3/16 flat 12 ft. 5c
Reels 225 ft. 1/16 35c, 1/8 60c, 3/16—85c

Camel H'r Brush
Med. 5c, Lge. 8c
Small 9c, Gas Mod. 15c

THRUST **Bearing**
½ doz., Sm. 5c
½ doz., Lge. 7c

Celluloid Radial ENGINES
1 1/2" 8c, 2" 12c
2 1/2" 14c, 3" 17c
4" 50c, 4 1/2" 65c

Machine-Guns
3/4" 2c, 1 1/4" 4c
1 1/4" Lewis..... 5c
1 3/4" Lewis..... 6c
1 1/4" R. M.....10c
1 3/4" R. M.....15c

WATER SPRAYER
Pivoted, heavy nickel plated 15c

FREE with all purchases over $1.00 your choice of: (1) Model Water Sprayer. (2) Model Builder's Knife. (3) Choice of 3-20" Model Plans—Curtiss, Heathe, Boeing, Driggs, Bellanca. (4) Masking Tape. (5) 6 sheets AA Tissue. (7) Sandpaper, 12 sheets.

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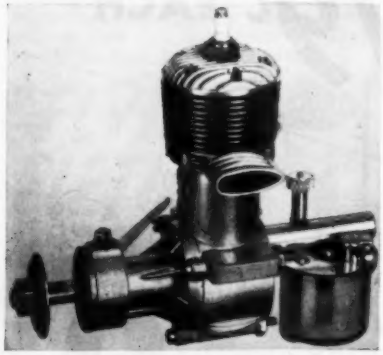
383 Seventh Ave., Dept. M, Brooklyn, N. Y.

the new 1/5 H.P., B class

FORSTER "29"



.297 inch—1/5 H.P.—$15.50 complete

it's ahead in

DESIGN, POWER, SAFETY *and* VALUE

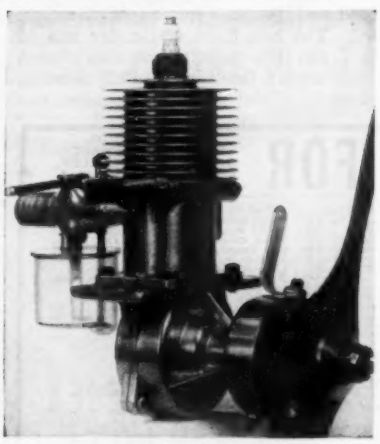
Equipped with the latest type rotary valve, hardened and individually lapped steel piston, new high turbulance combustion chamber, internal streamlining, and the new exclusive "clutch propeller lock," it is setting new standards of performance! The crankshaft is fully counterbalanced and hardened, the timing cam and tubular wrist pin are also hardened. High speed bearings, a new "snap" piston pin lock and other new features set it apart from ordinary motors.

Standard beam and radial mounts! It lends itself exceptionally well for inverted mounting, making perfect cowling easy. No bearing trouble—no extras to buy!
FOR QUALITY AND DEPENDABILITY, LOOK TO FORSTER

Write today for Folder "B"

For "C" class contest planes and Radio Controlled planes, consider the many advantages of the FORSTER

SUPER "99"



.997 inch—1/2 H.P.—$20.75 complete

The MOTOR of CHAMPIONS!

Sal Taibi's sensational seven-foot span "Hornet" of which outstanding performances you've read in last month's Model Airplane News, is powered by the "Super-99," the motor that offers you a throttle control carburetor, ball bearing crankshaft, exceptional easy starting, reliability, and long life, plus ½ H.P.

No more changing of spark lever or gas adjustment to vary the speed! The throttle alone does it, your radio mechanism can operate it.

Write today for Folder "C"

FORSTER BROTHERS
519 Lake Street, Maywood, Illinois

second. There was a total of eighteen entries. A thousand spectators attended.

Northwest Championship

The Northwest Model Airplane Championships were held May 4th and 5th. Events were: Cabin, Stick, Hand-launched Glider, Tow-launched Glider and Wakefield. Charles Hollinger placed first in the first two; Stanley Engle won the Hand-launched; Mickey Robinson the Towline and Yiochi Oikawa the Wakefield. The Grand Champion was Charles Hollinger. Respective winners in Classes A, B, C Gas were: Roy Namura, Lester Howard and Eugene Campbell. In the gas event there were 106 official entries. Many models were lost, gliders, towlines and stick as well as gas, into the surrounding hills. Some of the lads took so long to find their models that they missed the banquet, which was attended by 125.

Minnesota

The Minneapolis Model Aero Club held the first of its spring series of outdoor rubber model contests on May 5th. In these contests the events are Fuselage and Stick, held on alternate Sundays. First place winner was Ray Van de Walker with a flight of 5 min. 30 sec. Bob Toft placed second.

Oregon

John Dalaire, Jr. was declared the winner on April 27th at a contest held at Medford by the Medford Prop Nuts. Dalaire's model stayed aloft for an average of 1 min. 42 seconds, the longest flight being 3 min. 21 sec. Art Weiland averaged 60 sec. to win second. Allen Buckingham made the longest unofficial flight with a time when his craft flew for 19 min.

West Virginia

John Harrington of 111 Key Avenue, Elm Grove, writes that the Ohio Valley chapter of the Academy of Model Aeronautics of Wheeling is finally coming into form. Officials are: John Harrington, president; Howard A. Younginger, vice-president; Bernie Huggins, secretary, and Evert Parker, treasurer. Sponsors are Orville Hess, vice-president Wheeling Exchange Club; Peter Boyd of the *News-Register* staff and Joe Higgins, manager of the Glendale Airport.

Indiana

On May 19th the Purdue University model airplane club, the Purdue Aeromodelers, held its second annual contest. It was almost washed out by the rain of the night before and the morning of the meet and in the afternoon a 30 mile gale further hampered the contestants. However, despite the weather, a large number was on hand. Results of the contest were as follows. All times are in sec.:

Rubber Powered Fuselage Event: A. Rohrbaugh, 317.9; Joseph Vermoch, 302.2; Bob Romeiser, 290.4. Glider: Bernhard Penshaw, 144.7; Dick Obarski, 125.7; Robert DeBatty, 113.9. Gas: Howard Bonner, 457.7; James Bennett, Jr., 415.9; Harold Tremps, 399.8.

New Jersey Championships

Bud Van Wych, of Haledon, N. J., representing the South Passaic Aeroneers, dethroned Al Casano of Passaic as the Senior Champion of New Jersey at the second annual State Model Championship Airplane Meet (for rubber-powered models), which was held at Linden, on Memorial Day. The winner placed second in the fuselage and stick events for a total of 40 points. Casano placed fourth in the all-events standing. Following Van Wych were Francis McElwee of the Linden Aircraft Club with 27½ points and George Brown of Jersey City with 24 points. Van Wych received the Linden Rotary Club trophy for permanent possession. The Championship was decided on the basis of 25, 20, 15, 12, 9, 7, 5, 3, 2, 1, points for 10 places in each event.

The standings in the All-Events Championship were posted throughout the day on the bulletin board, and changes in the positions were made as soon as the flight ships were received at the desk.

Saul Levinson of Forest Hills was winner of the Junior Championship by winning the glider event and placing 8th in the fuselage event for a total of 28 points. He was awarded the Linden Recreation Trophy.

Seventy-one contestants competed in the five events which were scheduled on the program.

The Ridgefield Park Aero Club held a rubber powered contest at Cherry Hill, Route 6, East Paterson, on June 2nd, under the sponsorship of the American Society of Model Aero Engineers of which Edward P. Schlosser is director. Fred Graso won Class D with 251 sec. average; Charles Loach, Class C with 129 sec. average; Stick, Bud Van Wyk with 131 sec. average; Glider, Stephen Naurath, 49 sec. average.

COMING EVENTS

For the tenth year, the Canadian National Model Aircraft Contest will be sponsored by the Canadian National Exhibition on Monday, August 26, and Tuesday, August 27. The contest includes events for indoor and outdoor models conforming as much as possible to the rules as adopted by the N.A.A.

As in the past, American contestants are again welcome to compete unrestrictedly with their Canadian cousins in all events, and although involved in an unfortunate war, you will find no difficulties in crossing the Canadian Border, as Customs regulations have not changed.

Further details obtainable from Donald B. Jacobs, Canadian National Model Aircraft, 7th floor, Lumsden Building, Toronto, Ontario, Canada.

The Galesburg Model Airplane Club of 1026 Beecher Avenue, Galesburg, Illinois will hold a non-sanctioned contest at the local airport on August 5th. There will be three classes for gas models and a fuselage rubber event. This will be the sixth annual model airplane meet held in Galesburg. Write Charles Nelson, secretary, for further information.

The Model Airplane Club of Windsor, Ontario, will hold a contest on July 28th. As many model plane builders know, Windsor is across the St. Clair River from Detroit.

The Annual Model Airplane Contest sponsored by the Rotary Club of New Philadelphia, Ohio, in co-operation with the Tuscarawas County Model Airplane Club, will be held on August 4th at the

New Philadelphia Muncipal Airport, New Philadelphia, Ohio.

There will be rubber band and gas powered events. The rubber powered events will include Classes C and D combined and the gas powered events will consist of Classes A, B and C. Numerous prizes will be given, consisting of five gas engines, kits and other merchandise. It will be a sanctioned contest run under the new A.M.A. rules.

For entry blanks and information write to W. H. Gowan Jr., 422 Ray Ave., N.E., New Philadelphia, Ohio.

The American Airlines Gas Model Club is holding its second annual Gas Powered Model Meet at Fairmount Blvd. and Richmond Rd., Cleveland, Ohio on July 14th. Address correspondence to the club's headquarters, 9609 Lorain Avenue, Cleveland.

The Midwest Gas Model Airplane Contest, sponsored by the Omaha *World-Herald* and Benson Commercial Club, and sanctioned by the N.A.A., will be held at Benson Park, Omaha, Nebraska on July 21st. Write T. W. Summers, 538 *World-Herald* Bldg., Omaha, for further data.

Notices

We have a letter from Miss Marion Rathbun of 640 S. 4th Street, Aurora, Illinois who tells us that she will have four models at the National Championships, one of which will be a flying scale Puss Moth built from MODEL AIRPLANE NEWS plans.

Jimmy Ritter of 874 SW 1st St., Miami, Florida, writes and tells us that we inserted a picture under the wrong name in the May issue. The caption read: "Kurt Stevenson and his 9½ ft. wing span model." Actually it was a picture of Jimmy Ritter and his 9 ft. plane.

The 69th Regiment, known as the 165th Infantry, N.G.N.Y., is forming a Flying Club.

A new 65 h.p. Luscombe plane has been ordered and we are holding meetings at the 69th Regiment Armory, Lexington Avenue and 26th Street, New York City, at 8:00 p. m. on Mondays.

Without obligation to join the regiment, a limited number of memberships will be offered at $10 per member, plus $5 per hour for dual instruction and/or $3 per hour for solo.

Academy of Model Aeronautics

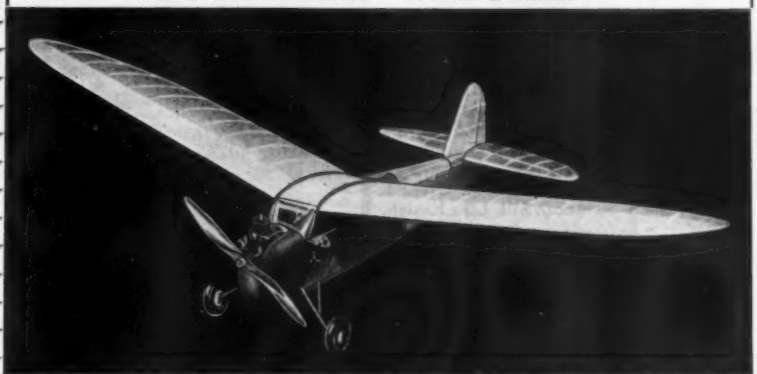
(Continued from page 23)

the national headquarters executive, serve without salary. A unique feature of the Academy is that it is located in the center of the Nation's capital with headquarters in the Willard Hotel, yet spends less for headquarters space than as if it were in a small town. This is because as a division of N.A.A. the Academy has the use of N.A.A. headquarters space and N.A.A. clerical and stenographic service. These cost considerably less than if the Academy attempted to undertake the work itself.

Typical activities of the A.M.A. include membership solicitation—for the more members the Academy has the more benefits it can bring to the modelers. Notable example of how the Academy can aid its members was the establishing of the gas-model-license class of membership and the drawing up of the first official regulations

For Those Who Like RED-BLOODED Flying Thrills the

New BUCCANEER "SPECIAL" ★★★★

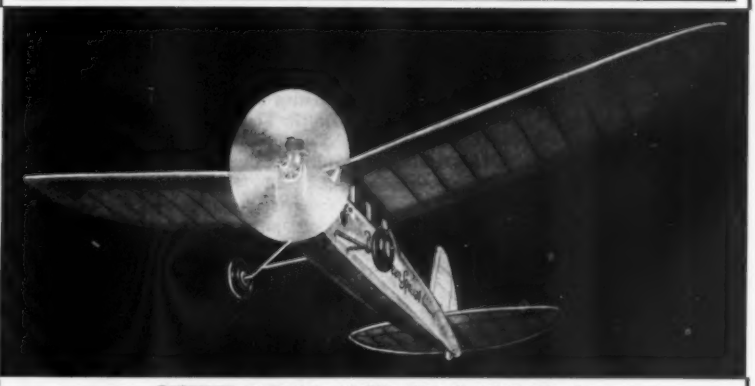


Note the low-slung fuselage and ultra-modern streamlining. Spin arresting tail design. Designed by Bill Ehinger, founder of BERKELEY and America's pioneer designer of commercial gas models. Plans drawn by Henry Struck America's No. 1 model builder. Flight tested by Sal Taibe, Metropolitan Champ and N.A.A. Record Holder.

SPECIFICATIONS: 6 foot wingspan, 6 sq. foot Wing area, 3 lbs. weight.
(Perfect for "60" Motors)

This is no "sissy" airplane. A real ship packed with thrills, excitement, and performance. Designed for model builders who want action in the air. A robust giant built with the famous "BUCCANEER" super strong construction. It packs performance. After a take off run of 100 feet, it picks up speed of 70 m.p.h., then up points the nose and you watch the "Special" become a pin-point in the sky.

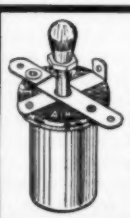
After the motor cuts, a miracle takes place. The speeding meteor changes to a floating albatross. A glide so flat and graceful that it's almost unbelievable. Imagine, on its first flight with an 11-second motor run at part throttle, the sensational time of 4 minutes 52 seconds!



Performance proven and perfected. Direct descendant from the original "BUCCANEERS," only models to hold all N.A.A. Records.

Check These Construction Features:
● Removable tail unit ● Movable ignition track ● Sheet wood covered leading edges ● Cap Stripped wing ribs ● Vibration PROOF motor mount can take new super powered engines up to ½ h.p. ● N. A. C. A. designed and tunnel tested airfoil ● Airfoil section stabilizer ● Staggered tail design, eliminates weight, increases stability ● Double strut cantilever landing gear designed for rough flying ● Small radio units up to 2 lbs. can easily be installed in cabin.

Check These Kit Features:
● Super clear plans by Henry Struck ● All wood parts printed out ● Wood blocks cut to shape ● Large quantities of cement ● Clear and colored dope ● Silkspan covering ● Genuine music wire landing gear ● Complete ignition and hardware necessaries found only in BERKELEY kits ● **BERKELEY Time-Air ignition timer and switch.



"TIME-AIR"

Combination Flight Timer and Ignition Switch—It only takes one hand to operate a "TIME-AIR"; the Perfected airdraulic flight timer. Pull out the plunger and lock it in position while starting your motor. When ready to take off pull over the lever and the timer begins to work. Weighs only ⅝ oz. Accurate settings up to 1 minute.

1.00 P.P. OR AT YOUR DEALER

$5.95 POST PAID

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MODEL AIRPLANE BUILDERS

WHITFIELD has developed a new BAMBOO TISSUE for GAS JOBS that can be applied

WET or DRY

of Superior Quality—Has great strength—Easy to Apply. **Gives a Smooth Silk Like Finish.**

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Western New York Gas Modelers

Drop us a card for free circulars

Lowest prices on all gas model items, motors, airplanes, race cars, boats. Immediate deliveries.

MODEL AIR ASSOCIATES

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PROPELLER HINGES

FOLD-BACK HINGES—made of finest steel, drilled and perforated for lightness and strength. Nothing to do but to fasten to propeller. 28 sizes. Detailed instructions. State width and length. Double—20c. Single—15c. POSTPAID. Foolproof rubber tensioners and prop shafts. Free price list on contest items. Send stamp.

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Best By Test Model Co., 175 Main, Ridgefield Park, N. J.

SEAPLANE KITS

THAT ARE ENGINEERED!

If Your Dealer Cannot Supply You Order Direct

SEA HORNET

Wing Span 44"—Class B Seaplane

Here is a ship that has everything! Appearance with interceptor performance! Gets off the water and climbs like a skyrocket! Coil, condenser and engine accessories easy to reach under removable cockpit cover. Kit contains everything necessary to finish the model—SILKSPAN, full sized plans, plywood, balsa, printed sheets, cement, dope, etc.

Price, postpaid less motor..... **$3.95**

Burkard Model Eng. Co.

2G East Ave., Larchmont, N. Y.

Full account of the 1940 Nationals in the Sept. issue on sale August 8th.

MOTORS! NEW REBUILT PARTS SERVICE

Send us your motor troubles! Expert repairs—seven years experience. Or, trade in your old motor on liberal terms, for a new one.

LANGE'S MODEL SUPPLIES

75 E. Adams St., RB, Chicago, Illinois

at a time when the future of the gas model sport was threatened by many local and state aviation officials because of lack of regulations and disregard of safety measures.

N.A.A. saved the day by formulating common-sense regulations and educating the modelers to fly their craft in a safe manner; this program is being carried on and extended today by the Academy of Model Aeronautics. Another indication that in union there is strength is that now available to Academy gas model flyers is an insurance program whereby gas modelers may secure upon payment of $1 a year, $500 property damage coverage, $500 personal liability coverage, $25 fire and $25 damage-resulting-from-transportation - accident coverage for gas models.

As the work of the Academy is becoming better known and as model builders become acquainted with its purpose and endorse its work and consequently desire to affiliate with it, hundreds of requests for membership information are received at headquarters each week.

The model aircraft industry is cooperating in a program to distribute information on the Academy to model flyers throughout the country. Manufacturers include Academy membership applications in their contest and motor kits; distributors and dealers keep a supply of applications for the convenience of customers. Through regularly published columns in the leading model aircraft publications, news of Academy activities is brought to hundreds of thousands of modelers each month.

Model clubs associated with the Academy number almost 200. These organizations have found that a tie-in with national activities has helped immeasurably in local work. The designation as an official A.M.A. chapter or affiliated club has proven of immense value to each of these model groups; national recognition resulting in greater emphasis locally on their undertakings. The usual procedure for newly established clubs is to request information on how to become an official A.M.A. chapter. Complete information and membership applications are forwarded to those requesting this.

Contest Directorship

Upon application, qualified individuals who hold leader-membership in the Academy are eligible for appointment as Contest Directors at no charge. These Contest Directors, usually working in conjunction with local Academy groups, request sanction for competitions well in advance of the dates when the meets are held. Upon approval by the Academy and the N.A.A. Contest Board the meet is publicized as a sanctioned contest and notice of it is sent to all other clubs and leaders through the monthly bulletin, MODEL AVIATION. With national recognition given such an undertaking, a much larger turnout and support for the competition results than if it had not been sanctioned by and conducted under the standardized regulations of the Academy.

Interest in the model aviation sport has grown to such proportions and has proven to be of such value that many service organizations, such as the Exchange Clubs, Junior Chambers of Commerce, American Legion posts, and so on, have included modelplane building and flying in their aviation programs and have made arrangements to sponsor the activity by holding Academy sanctioned competitions.

With these organizations, as with all other reputable groups genuinely interested in furthering model æronautics, the Academy works in close cooperation, both in the matter of sanctioning and publicizing meets and in providing qualified advisors and assistants wherever possible.

Through their Academy the model aeronauts of America are governing themselves, advancing aeromodeling and receiving commendation from aviation leaders everywhere.

Licenses

It is wise at this time to point out that the Academy, through its gas model membership, licenses the model builder himself and the license number that is awarded to the enthusiast covers any number of models built and flown by the individual.

The modeler is obligated to put the official A.M.A. license number on the upper right-hand wing of each model. The new low price of 10c for license numeral sets does not make this requirement a hardship for anyone.

Leaders are requested to point out that the new 50c rubber model membership does not include license numerals since it is unnecessary to license rubber powered craft.

It is the intention of headquarters to provide as much assistance and helpful material to leaders in the field as possible, and it will aid us considerably if leaders thoroughly study the material sent out, together with all the printed forms to familiarize themselves with the various functions of the Academy and the benefits of individual membership, so that a certain amount of unnecessary correspondence can be avoided in the regular routine work.

As the new Academy set-up becomes better known to leaders and modelers in the field, fewer questions arise concerning the changeover. However, there are several points headquarters would like to call to the attention of M.A.N. readers. This includes the announcement that model builders may participate in sanctioned competitions by holding either the old N.A.A. or the new A.M.A. license.

The item to be checked is the expiration date of the membership. In other words, the Academy did not supplant the N.A.A. Model Division; it merely absorbed it in its program of activity. All competitions will continue to be sanctioned by the N.A.A. Contest Board on behalf of the Academy. The new meet sanction applications state definitely that in order to secure such approval by the Contest Board, the Director must pledge to limit the participation to N.A.A. and Academy members only. There are to be no exceptions to this rule and it is impossible for the Academy to deviate from it regardless of the occasion. Such regulations are set up by the Board and Headquarters must follow its dictates.

Clifton L. Martin, of Hartford, Connecticut, conducted a most successful meet early in April for indoor modelers in the state armory in Hartford. Honors were taken by visiting flyers from Boston, Mass. Ralph Brown of Boston's Junior Aviation League took top honors and walked off with the Hartford Courant Trophy, the

Rotary Club Trophy, the Sage-Allen Co. Trophy and a gas model kit.

The Boston flyers were enthusiastic over the state armory, which is said to be the largest available place for indoor flying.

Contestants who participated in past National Meets held in Detroit under the sponsorship of the Exchange Clubs, will remember one of their most ardent boosters in that organization, Squire D. Eurich. At that time Chairman of the Aviation Committee, he worked night and day for months in advance of each meet to insure contestants receiving a hearty welcome in Detroit and a competition they would long remember.

In recognition of his services, Mr. Eurich was elected the first Honorary Fellow of the Academy of Model Aeronautics.

Competitions Sanctioned by Academy —N.A.A. Contest Board

For complete information write to contest director listed. His city is same as where contest is held unless otherwise stated.

July 13—BOSTON, MASS. Outdoor meet of Junior Aviation League. See May 18 note.

July 14—POUGHKEEPSIE, N. Y. Hudson Valley Midsummer Gas Meet at Poughkeepsie City Airport.

July 14—LAUREL SPRINGS, N. J. Monthly Meet for all classes Gas.

July 21—OMAHA, NEB. Gas Meet at Benson Park. Trophies, merchandise and cash. L. B. Bush, 610 Redick Tower Building.

July 21—ALBANY, N.Y. Capitol District Aeronautic Assn. Annual Rubber Outdoor Meet.

July 28—BALTIMORE, MD. Baltimore Model Airplane Assn. Rubber and Gas Contest at Municipal Airport. Merchandise and trophies. George H. Geil, 1509 Abbottston Street.

July 28—OTTUMWA, IOWA. 2nd Annual All-Iowa Model Meet at Municipal Airport for Gas and Rubber. $200 in cash, trophies and merchandise. C. P. Oleson, Municipal Airport.

July 28—PITTSBURGH, PA. Allegheny Mountain Area Model Aircraft Meet.

August 4—CLARKSBURG, W. VA. Maple Lake Hydroplane Meet for Class C & D rubber powered. Trophies, cups and merchandise. Carl A. Hopkins, 140 Thompson Street.

August 10—BOSTON, MASS. Outdoor Meet of Junior Aviation League.

August 18—PITTSBURGH, PA. Gas Free-For-All at Butler Airport.

August 25—POUGHKEEPSIE, N. Y. Hudson Valley Championship Gas Meet at City Airport.

August 25—ROCKFORD, ILL. Rockford Gas Bugs Annual Gas Model Meet at Gas Bugs' Field, for all classes. Cash prizes. R. K. Wilson, 411 State Street.

September 1—SALT LAKE CITY, UTAH. 2nd Annual Douglas Trophy Gas Model Contest for all classes. Merchandise and trophy.

September 8—WYANDOTTE, MICH. Indian City MAC 2nd Annual Gas Meet at Fort & Penn. Ave., for all classes. Merchandise awards. Fred Bashore, 558 Bondoe Street.

September 14—BOSTON, MASS. Outdoor Meet of Junior Aviation League.

September 14—PHILADELPHIA, PA. 4th Annual Quaker City Invitation Meet at Northwest Airport.

September 15—PITTSBURGH, PA. Allegheny Mountain Area Model Aircraft Meet. Merchandise prizes.

September 21—BOSTON, MASS. Junior Aviation League indoor meet.

October 5—BOSTON, MASS. Junior Aviation League indoor meet.

October 6—AKRON, OHIO. Edith Van Orman Chapter Outdoor Contest for rubber, tow line glider and gas. Merchandise prizes.

October 6—PITTSBURGH, PA. A.M.-A.-I.G.M.A.A. Championships at Butler Airport, for rubber and gas. Trophies and merchandise.

BOSTON, MASS. Junior Aviation League meets on Oct. 19, Nov. 2, Nov. 16, Dec. 7 and Dec. 21.

The Silver King

A NEW HIGH IN MOTOR PERFECTION

Most Up-to-date Motor on the Market. A Host of Exclusive Features

$16.50 post-paid

Including Smith Coil and Condenser

Here, you Class C builders, is the motor of your fondest dreams. A motor that hits a new high in motor perfection.

Liquid-cooled Carburetor
Silver King introduces for the first time a liquid-cooled carburetor, located within the gas tank, which eliminates all expansion from heat. No choking required at any time.

Exclusive Rotary Valve
Silver King's exclusive Rotary Valve licks your old problem of back pressure through the carburetor. Actuated by the crank pin, the Rotary Valve injects fuel through the crankcase back cover plate for a full third of the entire piston stroke. Enclosed by the gas tank, there's no expansion from heat. Compression simply CAN'T LEAK OUT!

Many Special Features
Piston of hardened special steel is all one piece—no holes or slots to permit distortion. Piston runs in steel sleeve die cast into aluminum cylinder. Rod, wrist and crank pins, crankshaft and cams are all steel, hardened, ground and lapped. Extra length bearings, 1⅝". Bore 13/16". Stroke ⅞". .5 cu. in. displacement. Weight 8 oz. 750 to 15000 r.p.m.

Try a Silver King
Make your next motor a Silver King. You're in for the surprise of your life—in easy starting, super performance, lasting satisfaction. Three models: Model F for Planes, $16.50; Model G for boats, $17.50; Model H for racing cars, $17.50. Postage paid. (Dealership inquiries must be on your company letterhead)

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Mail Coupon Today

May Motors, Inc., 7545 Russell Ave., Detroit, Mich.
Please send literature..... Money order for $..... enclosed for Model ..... Motor. (Add 3% Sales Tax if delivery point is in Michigan)

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City ..... State.....
Name of nearest model dealer requested:

Name .....

Street ..... City.....

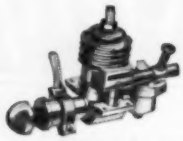
You Asked for It! Here It Is . . . Gas Model Insurance!

Through your cooperation and assistance the new Academy of Model Aeronautics is able to offer gas model insurance for all licensed gas model members of N.A.A. or the Academy.

The detail work of making the insurance available to Academy members and issuing the certificates of insurance is being done by the Academy without charge to the builder or the insurance company. In other words, it requires the efforts of a considerable sized staff to keep the records straight regarding the new insurance, make out the

THE HEAD OF THE B CLASS

Syncro B-30 Motor



The Outstanding Engine Building Triumph of 1940

Specifications

Bore 13/16"	R. P. M. 700 to 15,000
Stroke 9/16"	Weight 5½ oz.
Displacement .292	May be inverted
H. P. 1/7-1/6	Class B. N. A. A. Rules

The best that money can buy, yet only, complete with coil and condenser..... $6.95

FEATURES

Timer: Brush contact commutating mechanism not affected by oil, dirt and grime. No gaps to set. No points to file.

Carburetion: Set positively and accurately with locking device eliminating maladjustment from vibration or landing shock. Gas feeds always from lowest point of tank.

Cylinder: Moulded integral with manifolds from special aluminum alloy—longer wear than cast-iron or steel. Dissipates heat quickly.

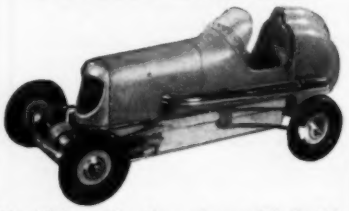
Piston Rings: 3 strong, narrow, long-lived rings plus the larger bore and short stroke make for smooth, steady power.

Lubrication: Force feed, plus oversized crankshaft bearings.

Power + Speed + Easy Starting + Light Weight, makes the B 30 the "Plus" value in miniature gasoline motors.

SYNCRO ROCKET

Assemble it yourself!



You'll have the time of your life building a real miniature racing car. All parts are completely machined and no special tools are required. The Syncro Rocket has direct drive eliminating power loss through clutches; front wheel drive and steering; perfect mesh gears hardened and welded to drive-shaft; oilite bearings; full cantilever springing and a steel frame.

It's the most *complete* racing car on the market. Speeds in excess of a mile a minute have been recorded. The Rocket is made in Detroit, "The Auto City."

Wheelbase 13 13/16"; overall length 19½"; weight 7½ lbs.; height 7½"; diameter of wheels 3¾".

The Most Complete Miniature Racing Car Kit Available, only..... $19.00 (less motor)

Send for Bulletin E-40

N. Y. Office 200 5th Avenue

SYNCRO DEVICES INC. 747 BEAUBIEN ST. DETROIT

proper forms, and submit names and policy payments to the insurance company. Instead of charging the modeler an extra 25 cents or some similar sum for this service, Academy Headquarters does this work for nothing and forwards the $1 remitted by the modeler to the insurance company.

Thus it is that the modeler secures his insurance for 12 months for $1 and the entire effort of setting up the records is undertaken by the Academy without an additional service fee.

Marchi At Headquarters

The newest addition to the headquarters staff of the Academy in the Willard Hotel at Washington is Bruno P. Marchi, well-known model airplane designer, leader and experimenter.

Mr. Marchi, formerly of Boston, Mass., was Assistant Director of the Jordan Marsh-Boston Traveler Junior Aviation League, first president of the Boston Gas Model Society, and holds a technical membership in the Institute of the Aeronautical Sciences.

One of the original charter members of the Academy, Marchi has held scientific membership in the organization for many years. He has recently completed special studies at Boston University and Massachusetts Institute of Technology, and is now engaged in preparing a thesis for his Aeronautical Engineering degree from B. U. Among his past accomplishments were the development of the Boston Low-Speed Wind Tunnel for model aeronautic research, the design and construction of radio controlled gas models, and numerous contributions to model aviation publications.

The new headquarters associate has also had considerable experience in radio work, having conducted over a period of a year a weekly aviation program for Station WCOP in Boston. Marchi has also worked in the sales promotion, advertising and reportorial fields. His past experience is expected to be of considerable help to the Academy in its regular work.

Marchi has numerous American and Canadian model aircraft duration records and has amassed an imposing array of approximately forty silver cups and trophies, in addition to scores of medals. He is well known for his participation in National Competitions and for his flying as proxy representative for foreign competitors in international events.

Contest Kits Endorsed

It is with real satisfaction that Headquarters representatives found the new Academy Contest Director Kits, which were designed to aid officials in conducting sanctioned competitions, met with hearty approval in all parts of the country.

The contest kit, which contains enough material to cover the participation of up to 35 contestants, is available to officially appointed directors at $1.00. For larger meets, additional armbands, score cards, light timing slips, etc., may be purchased.

If your club's competition director hasn't yet secured one of these kits, he is urged to do so without delay.

"I Am The Academy"

It is highly recommended that each leader and competition member of the Academy repeat "I am the Academy" several times each day, preferably upon arising and before slumbering off to dreamland.

Not only is the new Academy "of, by, and for the model builder"—the new Academy is the model builder. The Academy of Model Aeronautics is a non-profit, scientific, educational organization, designed to advance model aeronautics in the United States through fostering more competitions and standardizing the regulations and categories for aeromodeling enthusiasts. The Academy is governed by those individuals who unstintingly give of their time and efforts to boost American model aviation.

With this thought in mind, each leader and competition member is urged to spread the work of the Academy by interesting all his or her model air-minded friends in becoming members. The more people affiliated with the Academy, the more the Academy can do for those members. Already hundreds of model meets are being held each year which are the direct result of Academy education on model aviation among service clubs and other groups who otherwise might never have taken up the work of running meets and sponsoring clubs.

So the next time somebody talks to you about the Academy of Model Aeronautics, don't let him speak of it as some small, distant group. Instead, hasten to inform the speaker that you are the official representative of the Academy, and well qualified to discuss Academy problems and membership as its representative.

The Jackson Balsa Butchers started a drive for A.M.A. Chapter membership on March 1st and before April had rolled around the club had twenty-seven members, a senior advisor, and he had sent in for his Chapter membership. They held a contest for both gas and rubber powered models in Jackson, Mississippi, on June 23rd. The Junior Chamber of Commerce lent all its support and helped put on a swell meet. Those interested in joining the Balsa Butchers should write them % Jack Sampson, 4013 North State Street, Jackson, Miss.

WONDER BREAD SPONSORS MODEL PLANE EXHIBITION

The Continental Baking Company cordially invite Model Builders to participate in the "Sky Blazers" Model Aircraft Exposition, an exhibit and contest of model planes, on "Sky Blazers" Wonder Bread Day, Wednesday, July 31, 1940, at the New York World's Fair. Roscoe Turner will be Chairman, and Irwin S. Polk Managing Director.

The following events will be held in three major divisions:

Division I—SCALE OR REPLICA EXHIBITION MODELS

1. Models up to 16" wingspan
2. Models over 16" and up to 30" wingspan
3. Models over 30" wingspan.

Division II—EXHIBITION CONTEST FOR GAS MODELS

4. A.M.A. Class "A" Engines
5. A.M.A. Class "B" Engines
6. A.M.A. Class "C" Engines

Division III—ORIGINAL DESIGN MODELS

7. For models which suggest possible designs for aircraft of the future.

There will be 63 Major Prizes, consisting of trophies, plaques and medals. Three age groups in each event—Junior up to 16, Intermediate 16 to 21, and Senior over 21. For further details, listen to the "Sky Blazers" program, Saturday evening, 7:30 P.M. Eastern Daylight Saving Time, over the C.B.S. Network and write for complete rules and entry blanks to "Sky Blazers," 630 Fifth Avenue, New York City.

Models built from kits are eligible. All entries must be brought to the Fair on Monday, July 29, and be removed after the exhibit on Wednesday, July 31. No mailed or shipped entries will be accepted.

Finishing Models

Mr. Joy Duke of 105 Prospect Street, Northampton, Mass., writes and wishes to know how he can finish his model. He wishes the finish to be smooth and glossy yet light. Here is a hint which will help him and others who are faced with this problem:

The part to be finished should be thoroughly sanded, then coated either with a brush or by dipping, with a thin, hot solution of granular fish-glue. This glue looks very much like coarse brown sugar and may be purchased at a hardware store. It should be boiled in water so that its consistency is just a little lighter than 3-in-1 oil. After it has been applied hot, the parts should be left to stand or hung in a position so that the glue drains off. When the glue is dry to a brittle hardness the surface should be very lightly sanded with very fine sandpaper. The object is to smooth the glue surfaces without removing the glue to any extent. After the smoothing process apply enamel or Duco as you would to any ordinary surface. The glue will prevent this finish from sinking into the wood and it should be extremely light and glossy. This type of finish adds less weight than any other finish we know of.

Models for Money

I. Mari Rickel of 3127 SW 21 Street, Miami, Florida, sends us a note of an interesting incident which took place recently in her hometown:

Johnny Fine went home one evening after school and secured some bright red paper. He cut out letters to spell "Mile of Dimes," which was a drive to secure money for milk to give underprivileged children on Christmas. Then Johnny secured two pieces of string, tying the ends to his plane and fastening one string to the top of each letter and the other to the bottom. After he had done this he tied the two pieces securely to the last letter, thus finishing his streamer. Next addition to this list of material was two firecrackers.

His plane all ready to go, Johnny got his bicycle and rode down to the newspaper office where the six-weeks drive was about to start. Johnny asked permission to inaugurate the drive, which was granted. He started his gas engine, lit the firecrackers that were tied to the ends of the streamer and sent his plane into the air with a double bang that caused everybody to look. By this time the drive had started, with everybody on the street reaching into his pocket. The day's profit was five hundred dollars!

The LOW-PRICED . . . . . HIGH-POWERED MOTOR

That is

Unconditionally Guaranteed

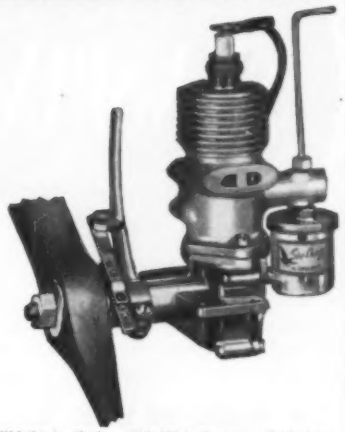
SKY CHIEF

Class "C"—1-5 H.P.

only

$6.95

Complete with Coil & Condenser



*Sky Chief "Lightning" 3 ounce Coil
*Bore 7/8", stroke 7/8", displacement .526
*R. P. M. up to 13,000 with 13" propeller
*All bearings are Diamond-bored and Micro-lapped
*Weighs approximately 10 ounces with coil and condenser
*Multiple-finned Cylinder made of Molybdenum Iron
*Piston centerless-ground and Micro-lapped with Perfect Circle Rings for longer motor life
*Heat-treated Crankshaft made of polished-ground steel scientifically balanced.

PRECISION ENGINEERED—BLOCK-TESTED

American Supercraft Corporation Union and Lake Streets Chicago, Illinois, U.S.A.

Wings of Democracy

(Continued from page 7)

63. The "Blenheim" carries a crew of two for this purpose, rear gunner and the pilot, who have two guns in the wings and three in streamline casings under the fuselage. The sleek Potez is armed with two shell guns under the fuselage in streamlines and two fixed nose guns, while the rear gunner operates two more guns on a swivel mount. These planes are not special production types but were converted for ground attack to be used in the raids on German-held positions in Scandanavia.

Combat conditions are bringing newer improvements on the modern fighter. Such items as even heavier armament, protective armor, bullet-proof or self-sealing fuel tanks and long range are being featured in the latest models. The complex equipment on modern aircraft has resulted in longer and more expensive training periods to produce airmen and care is being taken to protect them as much as possible because of the resultant slower rate of replacements.

The bombers and their crews have carried the brunt of the action up to now. Long distance flights without fighter protection has taken its toll in this branch of the service. More equipment has been added than was designed for, such as a decided increase in ammunition, heavier guns, extra fuel, which has resulted in a serious loss of maximum speed, making them easy prey for large groups of enemy fighters.

At the very beginning of the war serious losses were noticeable among the Fairey "Battle" and Bristol "Blenheim" types. In the case of the larger Armstrong Whitworth "Whitley" and Vickers "Wellington" these have been somewhat alleviated by flying at higher altitudes and their night duties hampered enemy detection and interception. However, in bad weather icing conditions became so bad, on several occasions, that the craft had to be abandoned in flight.

With all this the heavy bombers, notably the A. W. "Whitley" IV, have carried out some amazing and very creditable long distance reconnaissance and leaflet-dropping flights over large areas in the Reich, Austria, Czechoslovakia and Poland without incident. This has been very valuable in the training of crews in navigation and experience over enemy territory for use in

Learn AIRPLANE DESIGNING

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More Power USE Easier Starts

REVOIL

To Make Your Engine Run Better

BEEBE PRODUCTS CO., Box 641, ROCKFORD, ILL.

A covering tissue that is absolutely insoluble in water. It can be applied wet or dry like silk. *No other covering paper has this outstanding property.*

- **MADE IN U. S. A.**
- **EXTRA STRONG**
- **EASY TO APPLY**

For construction or repairs there is nothing better than this American made covering paper.

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The "Whitley" IV is an all-metal stressed skin monoplane of twelve and a half tons powered by two Rolls Royce "Merlin" IV engines totaling 2,100 horsepower fitted with two-speed superchargers. The "Whiteley" is the first bomber to have the new four gun power-driven turrets installed in the tail. Other models are fitted with Armstrong Siddeley "Tiger" 800 hp. engines and are slower.

Larger and lighter than the "Whitley" is the Vickers "Wellington" III weighing twelve tons of patented geodetic construction. Powered by two Bristol "Hercules" twin row sleeve valve engines of 1,375 horsepower each, the maximum speed is 180 m.p.h. at a range of 3,000 miles. A speed of 257 miles per hour can be reached on short range work. "Wellington" III's participated in the first British air action by raiding Kiel the day after war was declared. Types I and II are powered by Britol "Pegasus" and Rolls Royce "Merlin engines respectively. "Wellington" is also heavily armed, carrying three gunners manning eight guns.

Among the last and most successful of the French heavy bombers was the Leo. 45, an all-metal 310 m.p.h. monoplane powered by two Hispano Suiza 14 Aa twin row radials and weighing eleven tons. With a disposable load of seven tons, the Leo. 45 is distinguished by its sharp glass-enclosed nose, portly fuselage and dihederalled twin tail.

In the light bomber class the Bristol "Blenheim" IV with two Bristol "Mercury" VIII radials of 840 hp. each represents the major portion of Allied light bombers. With a credited speed of 295 m.p.h., it has as yet been mainly relegated to long distance reconnaissance missions. Too lightly armed for unescorted bombing, it is being replaced by the more powerful Douglas DB-7 and A-20.

The best of the medium bombers in action are Handley Page's "Hampden" and "Hereford," similar in design but using different engines; the former two Bristol "Pegasus" XX of 920 horsepower each, the other Napier "Dagger" VIII in-lines giving 1,000 horsepower each. Because of its tail boom design it mounts the most efficient armament in its class, and coupled with a top speed approaching 280 m.p.h. is a potent design.

The Amiots 350 and 351 conformed to the French penchant for shapely, high speed attack-bombers. Armed with cannon and heavy machine guns, they were all-metal low-winged monoplanes powered with Hispano Suiza 12Y 28/29 and Gnome Rhone 14N 38/39 radials of 950 and 1,100 horsepower respectively. Carrying a crew of three, a top speed of 310 miles per hour was attained, together with a cruising range of 1,200 miles.

The Breguet 690-B was the latest attack-bomber available in large numbers. A high mid-wing all-metal monoplane, it had a top speed of 290 miles per hour carrying a crew of three. Two shell guns in the nose and a rear machine gun constitutes the armament including a large supply of ammunition. Slung beneath and trailing behind the high aspect ratio wings are two Hispano Suiza 14 Ab radials of 675 hp. each. In following with usual French practice, the 690-B was to serve reconnaissance and fighter squadrons. The fighter model, 690-C3, was in production with two Gnome Rhone 14 M twin row radials of 700 horsepower each incorporating large oversize spinners covering the front of the engine cowls.

British squadrons are just being fitted with the new Bristol "Beaufort" I, an improvement on the "Blenheim." This 300 mile an hour mid-wing monoplane is powered by two 1,065 hp. Bristol "Taurus" twin row-sleeve-valve engines slung under the wings, driving full feathering Hydromatic propellers built under license. Two guns in the nose and a four-gunned power turret behind the wing make up the powerful armament. "Beauforts" are also going to the land based naval reconnaissance squadrons now largely equipped with Lockheed bombers.

The tactical value and use of the medium and heavy bomber against two types of military objectives, resisting and non-resisting, have already been formulated, and shown them to be a valuable adjunct to the fighting forces. To be worthwhile it cannot be employed in a hit and miss fashion, but must be treated with certain considerations. Against highly resisting objectives such as in Germany, the bomber must be given the same effective support employed by ground and naval forces: i. e., sufficient protection and supplementary assistance such as fighter and ground attack planes. The use of this aid for a potent attack is indispensable; in quenching resistance from defending anti-aircraft guns and in preventing hindrance by interceptors. That the bomber alone cannot attend to these functions and also attack its objective effectively is a proved and realized fact.

That the British are working on this basis is evident in their development of the long range fighter and the hundreds of reconnaissance flights over Germany for the purpose of photographing vital military bases, which have been in progress for months. Since new bases are constantly being set up and others shifted with their fighting units this is an arduous and painstaking job.

To counter the threat of German submarines, British naval air reconnaissance squadrons keep a constant vigil over their sea lanes. Patrol work is carried out with types ranging from the large 22 ton Short "Sunderland" down to small single engined Fairey "Swordfish" torpedo planes.

Backbone of the aerial "sea watchmen" is the "Sunderland," a military adaptation of Imperial Airways' "Empire" trans-Atlantic boats. Powered with four Bristol "Pegasus" XXII radials totalling 3,660 horsepower, they carry crews of eight to eleven men including four gunners manning ten machine guns, four in each turret and one on each side behind the wings. Fuel tanks carrying 1,520 gallons are mounted in the wings, giving a cruising radius of 1,700 miles at 175 miles per hour which amounts to about twelve hours of continuous flight. Because of this the big boats are fitted with many conveniences for the crew in regard to sleeping quarters and ability to prepare hot meals in the air. All of Imperial Airways boats have been remodeled for similar military duties.

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boats ever given is the Saunders-Roe "Lerwick," a portly Bristol "Hercules" powered monoplane. The two twin-row sleeve-valve engines of 1,375 horsepower each give a top speed of 230 m.p.h. and a range of 1,500 miles. Armed with power driven turrets in the bow, amidships and beneath the rudder, "Lerwick" meets the requirements for an economical and speedy reconnaissance-bomber suitable to rapid production.

"Made in U.S.A." Lockheed "Hudson" mid-wing bombers forsook patrol work to engage, with considerable success, in the harassing of German naval units ferrying troops into Norway. Several hundred of these Cyclone-powered "Hudsons" are serving in the R.A.F. and in engagements with German seaplanes have emerged victorious.

Considering these aircraft and the large numbers in service it can be realized that any delay has given the British a powerful air arm suitable for policies of either watchful waiting or active aggression. Until the Germans have available sufficient numbers of long range escort fighters to protect their bombers the present British interceptors can ensure safety against successful mass attacks on their strategic bases. Again, by that time they will have developed a counter measure in a more deadly fighter type. Every week is giving England more opportunity to further consolidate and enlarge on her air strength. The arrival of American fighters has further closed any gap.

That the sale of our latest military planes abroad is a dangerous threat to either our neutrality or defense is a theory which has been generally disproved. We are selling planes not to Great Britain alone but to anyone who can pay for and take them away. These large purchases have overshadowed our sales to numerous other countries to the extent of indignation and false alarm due mainly to ignorance of the facts. That Germany is unable to accomplish the same end rests on at least three salients: Her inability to pay cash, having no desire for our planes, the lack of means to transport them safely away.

As for hindering the national defense, America is the only world power that has not engaged in mass aircraft production and these huge orders are enabling our manufacturers and the government to determine the capacity output of our plants. Data on costs and mechanical problems is being meticulously assembled as such information has great value to military leaders. Again, one of the points in the release of our military planes to foreign purchasers specifically requires them to submit detailed reports on the performance of American planes to our government. This information will result in many improvements for our own use and keep us in the forefront in military aviation.

That air power is a powerful arm of the modern armies is being proved. Just how the fighting plane will emerge from this huge laboratory is an issue which we Americans can thankfully watch.

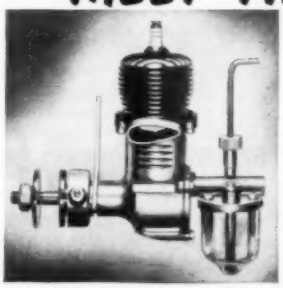
Fundamentals of Model Plane Design

(Continued from page 25)

be tapered from 5/16" to 3/16", starting the taper at point A, 2-1/2" from the front end of the stick. The rear end of the stick should be tapered in similar fashion, starting from point B, 10-1/2" from the front of the stick, or 8" from point A. Starting at point B the stick should be 5/16" deep. At a point 2-1/2" from the rear end of the stick, the stick should be 3/16" deep. From this point rearward the stick is of equal depth. This is indicated on the drawing in article 12. When you have finished the shape of the under edge of the stick, sand it off lightly on all four sides, without rounding the edges to any extent.

With operation six you start to assemble the parts of your airplane. Glue the stabilizer to the under rear end of the motor stick: center it carefully. Hold it in place with pins. Next cement the fin in place to the right side of the stick directly over the stabilizer, holding it in place in a similar manner. Figure 29,

MEET THE CHAMPS!!!



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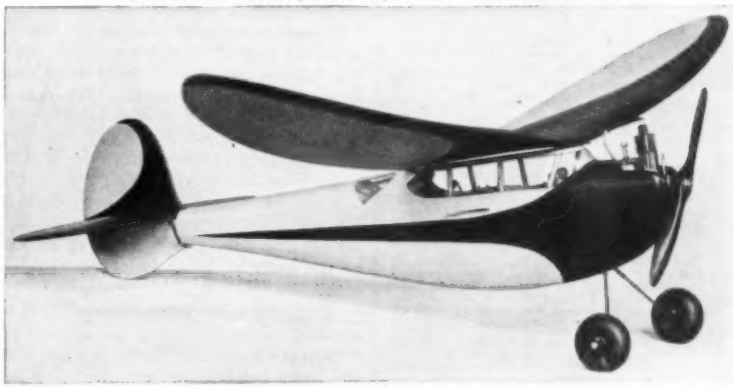

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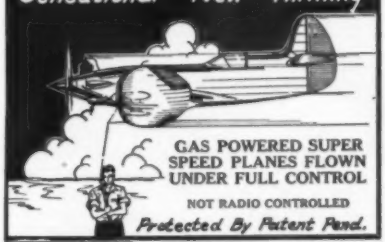

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article 12, will show you the exact positions. Now set this aside to dry.

Operation seven is shaping the landing gear. This may be a fairly difficult task if you have never had experience in wire-bending. In this case it is recommended that you gain practice by bending up some old pieces of wire into predetermined forms. This will give you a measure of your ability, and how much practice you will need before attempting to perform the operation.

The wire of the landing gear should be shaped according to the pattern in the plans. You will be able to complete your operation most easily by using pliers with "half-rounded" noses. Be sure to make the straight portions of the landing gear between bends, the correct length.

Operation eight is making the wheels, provided you have not purchased them. The wheels should be of hard wood about 3/16" thick at the center. They may be of any preferable shape as long as they are approximately 1-1/4" in diameter. They should be tapered from the hub to a thick edge at the rim.

Next, the ninth operation. Put the wheels on your landing gear. Slip the wheels over the axles, bending up the ends of the axles so as to hold the wheels in place.

Operation ten: Shape the tail skid according to the pattern.

Operation eleven: Next you can make the propeller bearing, provided you have not purchased it. A very satisfactory bearing can be made from an old corset steel. Simply heat the steel so that the temper is removed. Then cut it off so that it is approximately 1-1/4" long, bending up one end of the bearing piece so that the shortest leg is 3/8". A hole should be drilled in this end, 1/4" above the bend. This is the hole for the propeller shaft and should be 1/32" in diameter.

In operation twelve cement this bearing to the front end of the stick, as shown in the drawing, bending it firmly in place with thread.

Next is operation thirteen. Now slip the landing gear over the stick, just to the rear to the bearing one inch from the front end of the stick. Force the stick up into the "U" bend of the gear. Cement it in place, holding it with thread. Loop the thread around the two legs of the landing gear at a point immediately below the stick. This will hold it firmly.

Operation fourteen: The cement holding the stabilizer and fin in place now should be dry. Remove the pins and slip the tail hook over the rear end of the stick, making sure that the part forming the skid is downward and that the hook which will hold the rear end of the motor is above the stick. If it does not fit snugly, squeeze together the "U" of the tail hook with pliers until it is the proper size. When the hook is in the correct position cement it thoroughly in place to the top and rear of the stick and to the under side of the stabilizer.

Now you come to one of the difficult operations; fifteen. Here it is nesessary to cement the two wing-halves together so that they will form the proper dihedral angle. To do this it is necessary to bevel the inner surfaces of the butt-end of each wing, where the thick center ribs are attached. This is shown in the drawing. The bevel may be made with sand paper wrapped around a flat-sided block. By using great care in sanding the inner face of each of the thick ribs where it is attached to the wing, a perfectly straight bevel and snug fit can be made. Occasionally, after doing a little sanding, fit the two halves together in order to determine whether or not you are proceeding accurately. When these two halves fit together, the angle at the center should be such that each wing tip will be raised 1-11/16" above the center point of the upper surface of the wing. If the center portion of the wing is placed on a table, the tips should be raised 2-1/16" above the table.

Operation sixteen: When the bevel is finished cement the two wing-halves together, smearing the inner surface of each center rib with cement. Press the two halves together tightly and hold them in place with pins inserted diagonally from both sides of the center rib. Let the wing dry on a level surface with the tips raised the proper amount by small blocks or other similar objects.

In operation seventeen you come to a task which fills many model builders with awe; that is, carving the propeller. Consequently you should proceed with the greatest care in this operation. A policy of "thinking first and cutting after" will always bring preferable results.

The propeller should be cut from a block of hard balsa, 8-1/8" long, 1-3/8" wide and 11/16" deep. Draw a line across each end 1/16" from the ends of the block. From the intersection of these lines with the edges of the block draw diagonals. This is indicated in figure 29, article 12. Where the diagonals cross at the center puncture the wood slightly. This marks the place at which the propeller shaft hole may be drilled. Drill this hole before you start to carve the propeller. This may be done by pushing a pin perpendicularly through the block at right angles to its wide face.

Now you are ready to carve the propeller. The series of pictures shown in this article will provide a valuable guide in carrying out the various operations. Picture No. 1 shows the full block. The first operation is to cut out the block so that it appears as in picture No. 2, following the diagonal guide lines running from corner to corner.

Operation two is to cut away the edges of this blank, which are marked K in the drawing in figure 29. The resulting surface should run from the upper left diagonal line to the lower right diagonal line. (Diagonal lines should be made on both sides of the block.) This will be the back or "thrusting" side of the propeller blade. Both blades of the propeller should be fashioned in this manner. In performing this operation the rough work should be done with a penknife. Coarse sandpaper should be used to finish down the blade to a smooth surface, hollowing out the surface slightly and thus producing a little camber. Finish it off with fine sandpaper.

Operation three is shown in the next picture—here you cut the back sides of the blade. This corresponds to the upper surface of a wing and should be carved in such a way that the cross section of the propeller blades are similar to the section of a wing. The general shape of your propeller and other helpful hints are given in article 11. It is suggested you read this article before starting your operations.

When the back sides of both blades have been cut down to the proper thickness, so that the propeller is fairly thick at the hub and thin at the blade tips, you may round the tips of the blade to suit your fancy. Do this by first making a pattern and then tracing its outline on the inner surface of the blades at the tips. Then cut away the corners, following this outline. This operation, the fourth, is shown in picture No. 5.

The next step is to sand the whole propeller lightly so that it is smooth throughout its length.

Then balance the propeller by passing a pin through the shaft hole and suspending it in a horizontal position by the ends of the pin. If one blade of the propeller is heavier and drops, it should be sanded slightly on the back side of the tip and balanced again. This operation should be continued until the propeller remains motionless in any position on the pin at which it may be set.

Operation eighteen! Here you can make the propeller shaft according to the pattern by bending up the hook at one end. Then pass a washer or two over the end of the shaft and insert it through the shaft hole in the propeller, so that the hollow or concave sides of the propeller blade face the propeller hook. Then bend over the end of the shaft into a "U," pulling back the shaft and the end of the U into the wood of the propeller hub. When this is done coat the whole hub of the propeller and the slightly protruding U of the shaft with cement.

Now set this aside and proceed to make the center block by means of which the wing will be attached to the stick. This is shaped according to the drawing. The flat upper face of the block should be 3-1/2" long and 3/16" wide. The under face should be carved and bevelled sideways to fit in snugly to the dihedral groove of the wing at its center. Two sheets of 1/16" balsa should be cemented to either side of this block. These sheets are 3" long and should extend up above the block approximately 3/16". Thus a channel over this block and between these two sheets will be formed into which the motor stick will be inserted.

It is necessary that the wing have the proper angle of incidence; namely, two degrees. Therefore the depth of the block at the front and rear should be of different measurement. The depth at the leading edge of the wing should be 1/8" less than at the trailing edge. These distances may be regulated by cutting down the top of the block at the front or rear, as required. When this is done the side pieces may be cemented to it. Be sure that the grain of the side pieces is vertical to and not parallel with the wing chord.

When this center block unit is completed cement it in place to the center of the wing, holding it firmly with pins until the cement is dry. (See plans.)

Operation twenty: Now assemble the propeller by hooking the propeller shaft through the front bearing.

Operation twenty-one: Make the "S" hook which is to hold the rear end of the motor to the tail hook, shown in the drawing. Your plane now is nearly assembled.

Operation twenty-two is to make the motor. This is composed of four strands or two loops of 1/8" flat rubber. The rubber should be strung between the propeller hook at the front and through the S hook (hook to the tail hook) at the rear. Do not stretch the rubber when making the motor. Tie the two loose ends of the motor together in a square knot so the knot will be at the rear end of the motor and not at any point along its length.

When the cement holding the center block of the wing is dried remove the pins and insert the frame-stick in the channel of the block. Tie it in place with a rubber band. The side-view in figure 29 will indicate the approximate position in which the wing should be. Its center should be located about 5-3/8" from the front end of the stick.

Its final position, however, is determined by balancing the plane. Rest is across your finger, supporting it at a point under the center ribs of the wing. (Marked CG, figure 29.) If the plane is in balance it is ready to flight-test. If the nose drops move the wing slightly forward until it balances. If it is tail-heavy move the wing to the rear, the proper amount to attain balance. Now your plane is fully assembled and ready to fly. A little check over your workmanship and adjustments "here and there" would be advisable.

Undoubtedly the urge will be strong to fly your ship. Therefore proceed to a cleared space, free of obstacles, then glide your ship by tossing it gently forward in a *horizontal* position. If the guide is smooth and even the propeller may be wound up for your first flight. It is always advisable to put only a few winds into the motor to start with, gradually increasing the number of turns with each succeeding flight.

Next month we will tell you how to fly and control your ship properly.

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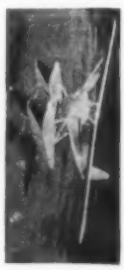

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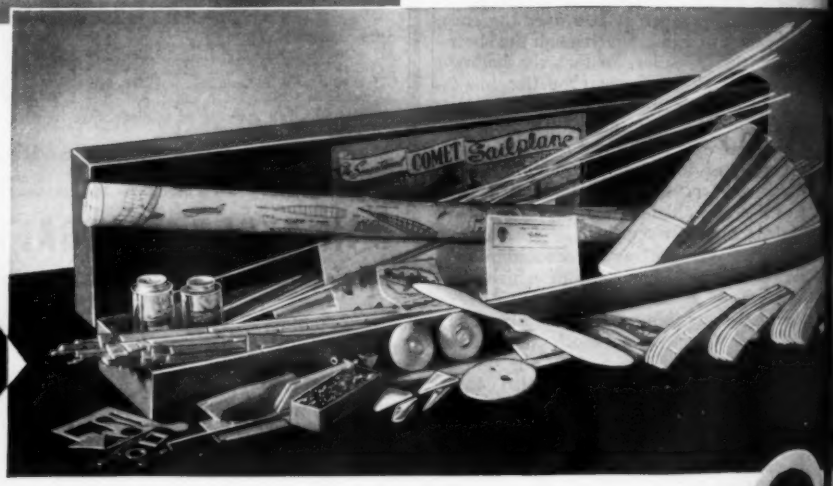

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